

1 IN THE UNITED STATES DISTRICT COURT

2 FOR THE DISTRICT OF OREGON

3 PORTLAND DIVISION

4 UNITED STATES OF AMERICA, )

5 Plaintiff, )

Case No. 3:17-cr-00226-JO

6 v. )

May 21, 2018

7 W. JOSEPH ASTARITA, )

8 Defendant. )

Portland, Oregon

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12  
13 EVIDENTIARY HEARING - DAY 1

14 Pages 1 - 197

15 TRANSCRIPT OF PROCEEDINGS

16 BEFORE THE HONORABLE ROBERT E. JONES

17 UNITED STATES DISTRICT COURT SENIOR JUDGE  
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TRANSCRIPT OF PROCEEDINGS

(May 21, 2018)

(In open court:)

THE COURT: Good morning, everybody. Have a seat. Just a second, Mr. Sussman. Have a seat. Get squared away here.

There are some ground rules I wanted to talk to you about to start with. First of all, we're here to screen some very technical matters that the -- the preparation has been outstanding on both sides, and as -- in a court matter, I -- especially at this level, I do not ask any or many questions. I figured that you talented lawyers are going to cover everything, and if you don't, then you probably don't have a good reason to do so. So I'm not going to be subjecting witnesses to my own questions or inquiry. I anticipate that counsel will cover the territory.

We are going to be screening 10 or 11 experts, and the time -- we're not under any time pressure for anything. I will be interrupting the schedule very minutely to clear some criminal cases that have to be addressed. The first one we'll have this morning is 11:45.

So other than that, we'll be -- our court hours will be from 9:00 to 12:00 and from 1:30 to 4:00. Don't feel that you have to fill in the time because the Court has to have time to not only reflect on what you've done today, but also to prepare

1 for tomorrow.

2 My schedule today is for Frank Piazza and Bruce Koenig and  
3 Victoria Dickerson. I mentioned earlier that Mr. Noedel is  
4 also critiquing Ms. Dickerson but can do so tomorrow if he's  
5 not -- not available today.

6 If you need to use the restroom, it's around the corner,  
7 and you don't have to -- just leave the room and come back and  
8 let your others do it, unless you want to recess. Let me know.

9 Do you have any questions on order of things at this  
10 point?

11 For the government?

12 MR. SUSSMAN: We have no questions, Your Honor, but  
13 we did want to let the Court know that we may also be calling  
14 Deschutes County Deputy Sheriff Kevin Turpen today.

15 THE COURT: Oh.

16 MR. SUSSMAN: And that there may be another expert  
17 for the defense testifying tomorrow, Mr. Alexander Bray, who I  
18 understand is a statistician.

19 THE COURT: Okay. I was pleased to see you found a  
20 local statistician.

21 Any questions on procedure?

22 MR. CARY: Your Honor, no questions. I did want to  
23 take the opportunity to introduce Mr. Astarita, Joe Astarita,  
24 who is here today.

25 THE COURT: How do you do, sir?

1 MR. ASTARITA: Fine, sir. How are you?

2 MR. CARY: Your Honor, if it pleases the court, I  
3 have about 15 to 20 minutes of opening remarks I'd like to make  
4 that I think will put the testimony in context.

5 THE COURT: That will be fine. Do you want the  
6 government to make any -- do you want to make any opening  
7 statement -- comment?

8 MR. SUSSMAN: Well, we do have a couple of  
9 preliminary matters before we launch into the hearing,  
10 Your Honor.

11 THE COURT: That will be fine. This is your  
12 opportunity to do so.

13 MR. SUSSMAN: One is in respect to Mr. Bray, their  
14 statistician. To date, we've received only Mr. Bray's  
15 curriculum vitae. We have not seen an opinion. We have not  
16 seen any conclusions. We've not seen a report. We understand  
17 that as of last Friday, at least, a report had not yet been  
18 prepared; but we haven't even gotten a summary of what his  
19 opinion or his conclusions will be in this case. We also have  
20 gotten no discovery on what the bases for his opinions or  
21 conclusions are going to be.

22 We've asked for that material, and, in fact, at the  
23 hearing about a week or so ago Mr. Angeli stood up and told the  
24 Court that the defense had reverse-engineered the data in  
25 Mr. Haag's 2008 article and that that was the basis for their

1 conclusion that there was significant statistical flaws in it.  
2 We have not seen that reverse-engineered data. We've seen  
3 nothing.

4 In order for us to effectively cross-examine Mr. Bray,  
5 we're going to have to see something from the defense.

6 THE COURT: Right. But I have the same problem with  
7 Mr. Piazza. We had a communication situation. I have had  
8 nothing except a skeletal report from him. We're waiting to  
9 hear his direct.

10 We'll hear from the statistician at the time that he will  
11 be scheduled to testify, but I assume you'll make every effort  
12 to get a report to him in a timely fashion.

13 MR. CARY: Yes, Your Honor. He's working as we  
14 speak. In terms of the reverse engineering, that was attorney  
15 work product. It was our -- what attorneys did to try to  
16 figure out the statistics, and it's not -- he's doing his own  
17 independent work, not relying on the work that lawyers did.

18 THE COURT: Somewhere along the line, before I make a  
19 decision, you'll be given ample time to see what he says and to  
20 be able to cross-examine him.

21 MR. SUSSMAN: Very good, Your Honor.

22 Also, this past Friday we received word from Counsel that  
23 they did not see the need to have two separate ballistic  
24 experts testify at this hearing, so they've elected not to call  
25 Mr. Alexander Jason as a witness at the hearing. It was not

1 clear to us, however, whether they were also going to withdraw  
2 Mr. Jason's declaration from their moving papers or not.

3 THE COURT: Don't know. Would you like to talk it  
4 over?

5 MR. CARY: We would like to talk it over, Your Honor.

6 THE COURT: Why don't you do that. We'll get  
7 started, and then you can, during a break, let him know.

8 MR. CARY: Thank you.

9 MR. SUSSMAN: Thank you, Your Honor.

10 THE COURT: Now, did you want to make any other  
11 comments at this point?

12 MR. SUSSMAN: Not at this point. Thank you.

13 THE COURT: Do you want to make a brief statement?

14 MR. CARY: Yes, Your Honor.

15 THE COURT: By the way, I don't have any set rules.  
16 You can speak from counsel table. You can go to the lecturn.  
17 Thank you.

18 MR. CARY: Thank you. I would like to begin by  
19 thanking Your Honor and the court staff for all the  
20 extraordinary hours they've put into this matter already and  
21 all the hours and work ahead. It's said -- we've all heard the  
22 expression that a picture is worth a thousand words. That's  
23 especially true for trial lawyers. Every trial advocacy book  
24 says, "Show. Don't tell."

25 I had the privilege of interviewing a juror on a recent



1 case I tried who told me over and over again that the pictures  
2 are what was the most convincing evidence in the case. And the  
3 problem, Your Honor, with this case is that pictures are being  
4 used that purport to be based on scientific methodology. And  
5 if a picture is worth a thousand words in normal everyday life,  
6 if it purports to be based on science, it's worth a million  
7 words or more. It's very dangerous if jurors are led to  
8 believe that a picture is based on sound scientific methodology  
9 when it may not be.

10 And the problem in this case, Your Honor, is that the  
11 government is taking this picture, which is actually the  
12 picture that we understand the government to say is taken at  
13 the exact time of round five -- we call it "the round five  
14 frame" -- and they're taking that photograph, where you can't  
15 see hardly anything, very blurry, taken more than two miles  
16 away. There's no muzzle flash, no flash of a gun going off, no  
17 recoil from the gun rising from a shot.

18 THE COURT: That's taken from the helicopter?

19 MR. CARY: It is, Your Honor. That's the fuzzy FBI  
20 overhead -- actually, it's an airplane. A fixed-wing aircraft.  
21 It's over two miles away, Your Honor.

22 They're taking that photograph, which is fuzzy and hard to  
23 see, and it's being converted into this, which is a crystal  
24 clear image with models of human beings -- not the actual human  
25 beings, but models -- based on hearsay evidence, that are

1 placed in there.

2 And it's based on, Your Honor, an undocumented frame  
3 analysis. Today we still don't have a report explaining how  
4 they chose the frame. It's based on subjective measurements of  
5 the angle of the shot. It's based on a cone. That cone that  
6 you can see there that is not validated by an applicable study,  
7 by an appropriate study, and the vehicles and the models are  
8 subjectively placed into that photograph, Your Honor.

9 THE COURT: Okay.

10 MR. CARY: There are lots of measurements taken, but  
11 the placement of the vehicles -- the measurements of the  
12 vehicles, but the human being models and the vehicles are  
13 placed there in a subjective manner on a snowbank that is  
14 dynamic and moving.

15 THE COURT: Just a moment. I said I wouldn't  
16 interrupt. I'm violating my own rule. So I have a breakdown.  
17 Finicum is the pink?

18 MR. CARY: Yes, Your Honor. Yes, Your Honor.

19 THE COURT: Then we have a special agent in red, and  
20 we have the defendant in blue and another special agent in  
21 green, and then we have -- and a trooper in orange and a  
22 supervising agent in yellow, just so -- for clarity.

23 MR. CARY: Yes, Your Honor. That's correct.

24 THE COURT: Thank you.

25 MR. CARY: Now, this diagram is sort of the star of

1 the show, but it's not the first diagram in the case. This  
2 came along later.

3 The first diagram is what we call "the Turpen diagram."  
4 That was the basis for the indictment.

5 When we first met with the government in this case and we  
6 first came to court, we told the government we thought that  
7 there were major methodology errors in this diagram and we  
8 intended to challenge it on *Daubert* grounds. And on the day we  
9 thought discovery was just about to close, they brought a new  
10 team in to do a new analysis.

11 This analysis, Your Honor, is inappropriate in the sense  
12 that the measurement of the angle was not done in an  
13 appropriate manner, and the figures, just like the other one,  
14 are placed in there in a subjective manner, without science.  
15 We thought that they would abandon this completely, and we have  
16 a diagram here, that we'll put into evidence, that superimposes  
17 in yellow -- that's the original analysis that was done, the  
18 original cone, and in gray is the -- is the new tone. That's  
19 the -- the Terpstra analysis is below; the Turpen analysis is  
20 up above. They're very different. And both of those  
21 methodologies, Your Honor, cannot be correct.

22 Here is an overhead view. Once again, there's a  
23 substantial difference. And if we look at it from behind, we  
24 would see no overlap in 3D at all. They can't both be correct.  
25 The government clings to both of these, nevertheless, and we're

1 here for both of these different -- different analyses today.

2 Now, in addition to this Turpen versus Terpstra analysis,  
3 there's also an analysis with -- that needs to be done with  
4 respect to enhancing video images. Once again, this is the  
5 overhead video taken. It's zoomed in, without any change to  
6 the pixels, from over two miles away. It's very furry -- fuzzy  
7 and blurry.

8 This is the enhanced frame that they're -- that Mr. Piazza  
9 has made, where he sharpens the image, and our experts will  
10 testify, Your Honor, that when you sharpen the image it  
11 actually changes the pixels in the photograph. The pixels are  
12 the little dots that make up the image, and it's actually been  
13 changed. That shouldn't be done in a forensic context. That's  
14 what our experts will say.

15 Moreover, there's no record, no notes, no documentary  
16 record of how they changed the photo -- changed the images. So  
17 it's our view that that's a separate track, that these enhanced  
18 video images should not be included in evidence. It's  
19 especially important because one of the issues is who is moving  
20 and when. And when you take a blurry image and you change the  
21 pixels so this looks less blurry, it changes what you see in  
22 the photograph.

23 So back to the Terpstra and Turpen tracks. We appreciate  
24 very much, Your Honor, the vast experience you have. We know  
25 you wrote the first *Frye* opinion in Oregon when you were on the

1 Oregon State Supreme Court, and we read the *Baxter* decision  
2 over and over and over again, learning what we can from it.

3 But the government and the defense have a different view  
4 on what the factors that should be used in this case are, and  
5 we think, right out of the government's brief, that the five  
6 factors that are traditionally used in a *Daubert* analysis  
7 should be used here.

8 Number one, whether the expert's theory, technique, or  
9 method can be or has been tested; two, its known or potential  
10 error rate; three, whether it has been subjected to peer review  
11 and publication; four, whether there are standards controlling  
12 its operation; and, five, its general acceptance within the  
13 relevant community.

14 Now, the government cites a number of cases for the  
15 proposition that, well, you don't always have to apply these  
16 five factors, and we agree with that. There are occasions  
17 where you don't have to apply the five factors.

18 I just want to briefly look at three of the government's  
19 cases for that proposition.

20 The first is *Primiano v. Cook*. It's a case in which a  
21 medical doctor was allowed to testify that a defect in an  
22 artificial elbow was so rare that it was not in the literature.  
23 And the Ninth Circuit held in that case that an expert may  
24 testify about phenomena so extraordinary -- so extraordinary  
25 that the specialists who publish articles do not see it in

1 their practices.

2 Of course that makes perfect sense when the very purpose  
3 of the testimony is to say this is something very rare,  
4 something extraordinary. The expert ought to be able to  
5 testify this is rare. What I see is not what we normally see  
6 in the literature.

7 Another case is *Estate of Barabin v. AstenJohnson*.  
8 Another Ninth Circuit case. That was an asbestos case. In  
9 that case, the trial court was reversed for not applying  
10 *Daubert* but, instead, quote, "giving each side leeway to  
11 present its expert testimony to the jury."

12 The government, in their supplemental response, is this  
13 should be a battle of the experts. It should all go to the  
14 jury. The Ninth Circuit rejected that very proposition in this  
15 case in the government's own brief.

16 *City v. Pomona*. A water contamination case. The Ninth  
17 Circuit held that the mere fact that the EPA had not endorsed  
18 results did not support exclusion where the methodology had  
19 been, quote, "tested, analyzed, and subjected to peer review  
20 for at least ten years." In other words, the scientific method  
21 needs to be applied. It needs to be scientific.

22 And here, Your Honor, what we intend to show over the next  
23 couple of days is the scientific method has not been applied to  
24 these techniques as being used in this particular case. Some  
25 of the techniques may be appropriate in different cases, but

1 not as applied to this case.

2       So with so many experts, I get -- I got confused for the  
3 first several months, after I heard about Mr. Terpstra, the  
4 difference between Turpen and Terpstra. So I thought it would  
5 be helpful to break it down. There are really two different  
6 tracks in this case. The first is that original Turpen  
7 diagram, the one that's not in 3D. His analysis, his diagram,  
8 is dependent upon lots of other analyses. First of all, did he  
9 choose the right frame to do his analysis? And there's still  
10 some confusion in the defense's mind about how he went about  
11 that process.

12       Second, was the trajectory analysis done correctly?  
13 That's the centering cone technique that Ms. Dickerson will  
14 testify about.

15       In addition to that, there's a question about whether the  
16 plus-or-minus-5-percent accuracy rate used for the centering  
17 cone method is properly applied to that method.

18       And then, finally, the methodology used by Turpen himself,  
19 which I'll get to just a bit more in a minute. The other track  
20 is the Terpstra track. The "Terpstra model" we call it. His  
21 is dependent upon the frame collection which was done by  
22 Mr. Piazza, who will be the first witness today. The  
23 trajectory measurement in that case uses something called the  
24 rocker point method done by Mr. Haag which also has the same  
25 "5 percent plus or minus" issue at play there. And then the

1    Terpstra methodology that he used himself.

2           So going to the first leg, the first analysis frame  
3    selection, we have in the courtroom today Mr. Bruce Koenig, who  
4    is one of the leading -- perhaps the leading audio/visual  
5    expert in the world, especially as it applies to gunshots. He  
6    was involved in analyzing the Reagan assassination attempt, the  
7    Kennedy assassination, and he will testify Mr. Piazza has no  
8    gunshot expertise. He did not provide a meaningful report. He  
9    took no notes of his process. There's no meaningful error rate  
10   to what he did. He used inappropriate visual cues without  
11   accounting for the difference between audio and visual. He did  
12   not account for the difference between the speed of light and  
13   the speed of sound, and he used inappropriate narrowband --  
14   band spectrograms and low-resolution waveforms to analyze the  
15   gunshots, and he'll explain to you why that's inappropriate.

16           The lack of a meaningful report should be especially  
17   troubling because the courts have held that reproducibility is  
18   an essential component of scientific reliability.

19           In this case, we don't have notes; we don't have a report.  
20   We're going to learn today how -- how it was done, apparently,  
21   for the first time.

22           And based on the government's opposition, we thought we  
23   would hear that, "Well, he didn't take notes, but the computer  
24   kept track of everything," and we learned on Friday that that  
25   is not so.



1 Step number one, selecting the correct frame was not done  
2 in an appropriate scientific manner for no other reason because  
3 there's no record of what was done, and it can't be reproduced,  
4 and that's critical to the scientific method.

5 Let me turn to the second leg, what we call the trajectory  
6 measurement. There are three different types of trajectory  
7 measurements. There's the two-point trajectory rod method,  
8 Dickerson's centering cone method used, and Mr. Haag's rocker  
9 point method.

10 Mr. Noedel, in his supplemental declaration, has some good  
11 illustrations of the three different types of methods. Here's  
12 the two-point method where you have an entry point and an exit  
13 point in a straight line. The rod goes through both lines.  
14 That is well respected. It has been validated. It is a  
15 technique that works. But the problem is there weren't two  
16 points in this case, and so it wasn't used in this case.

17 The centering cone method used by Dickerson, that's where  
18 you take -- you just have one point, and then because the hole  
19 does not line up with the -- with the rod, you use some  
20 additional material called a centering cone to fill in the  
21 space.

22 This is a photo of that analysis actually in this  
23 particular case.

24 And then the third is the rocker point method used by  
25 Mr. Haag, which we believe is subjective and not appropriate --

1 not appropriately validated.

2 Here is a picture of that in this very case. Here is the  
3 rocker point method where Mr. Haag finds through subjective  
4 feel what he thinks is the sweet spot, and then he holds it in  
5 place with a mechanical arm and duct tape.

6 So it bears repeating that both of these analyses can't be  
7 correct because they both have completely different results.  
8 Here is the side view; here is the overhead view.

9 Frankly, we thought the government would have abandoned  
10 one or the other by this point.

11 Let's talk about the centering cone method for a minute.  
12 The problem with the centering cone method, our expert will  
13 say, is that it does not account for deflection. The bullet  
14 changes course. And we believe that almost everybody in this  
15 case is going to agree that this is a shot that actually  
16 reflected -- showed deflection, and the centering cone method  
17 is not appropriate methodology when there's deflection. And we  
18 believe Mr. Haag himself will say that the centering cone  
19 method was not an appropriate methodology because of this  
20 deflection.

21 And because of the deflection, I think the defense and the  
22 government actually agree that the rocker point method is  
23 better. It doesn't mean it's validated and appropriate, but  
24 it's better than the centering cone method. It's better, but  
25 it's not appropriate here.

1           Here is a picture of Mr. Noedel, who will testify -- he  
2 will testify that the rocker point method is not described in  
3 literature. It's highly subjective. It's based entirely on  
4 the feel of the examiner. It's sensitive to smaller errors in  
5 rod placement. He wrote in his supplemental declaration that a  
6 one-millimeter difference, in terms of where the rod is, will  
7 cause a change of 14 degrees in the angle of a shot. One  
8 millimeter is less than the thickness of a dime. It's about  
9 the size of a normal head of a pencil. And he will testify  
10 it's never been validated through an appropriate study.

11           The plus or minus 5 degrees is another aspect of this.  
12 There's a 2008 article that they -- that they rely on. It does  
13 not state which of the three techniques was used. We have  
14 these three techniques, but, instead, that 2008 study  
15 apparently just lumped them together. And we asked for the  
16 data to back it up, and it wasn't available to us.

17           There are very few shots at each angle, it wasn't blind,  
18 and statistics were misused. And there was some reference to  
19 that this morning. We did some digging. We did our duty to  
20 try to -- we were actually very surprised to hear that the  
21 government is now taking the position that the 2008 study  
22 validates the rocker point method, because it's not mentioned  
23 in any meaningful way in the study. In fact, the study  
24 actually says that a different -- different approach may be  
25 necessary when it's a shallow-angle shot.

1           And it surprised us, and so we asked for the backup data.  
2 We didn't get it. We did what Mr. Sussman referred to as our  
3 reverse engineering. A bunch of lawyers dug in and tried to  
4 figure out the statistics. We feel as though, based on little  
5 undergraduate statistics, that we found some major statistical  
6 errors.

7           We went to some of the leading experts in the country  
8 to -- to validate that. A number of them gave us preliminary  
9 opinions. "It sounds like you're right, but I'm not available  
10 in the short period of time that we have to testify." So I'm  
11 pleased to report that after a weekend of making calls, we were  
12 able to get in touch with Dr. Andrew Bray, of Reed College, who  
13 is working on his report as we speak. He will testify, we  
14 believe, that there are major design flaws in the 2008 study,  
15 there are major statistical errors, and it does not validate  
16 plus or minus 5 degrees for the rocker point method.

17           That's Phase II. That's the second leg. Trajectory  
18 analysis.

19           The third is the work actually done by Turpen and Terpstra  
20 themselves, and we -- frankly, Turpen is fairly simple, but  
21 Terpstra is quite complex in some areas because there's a lot  
22 of math he did leading up to what we think, in the end, is a  
23 subjective replacement.

24           We have two experts in this area. Eugene Liscio, who is  
25 an engineer, one of the leading reconstruction experts in North

1 America; and Cliff Mugnier from Louisiana State University, the  
2 godfather of photogrammetry, the science of taking 2-degree  
3 photos and turning it into a 3-degree image.

4 He'll testify, Your Honor, that you can't take that fuzzy  
5 image of a vehicle in a dynamic snowbank and turn in into a 3D  
6 model with the precision that the government claims they can do  
7 in this case.

8 Briefly, on Turpen. Many witnesses, including Mr. Turpen  
9 himself, testified that the truck moved after the shooting.  
10 Mr. Turpen does not account for how the truck's movement during  
11 the nine hours following the shooting affected the trajectory.  
12 There are a number of witnesses that said it undoubtedly moved,  
13 including Mr. Turpen, but he assumes it stayed in place.  
14 There's no scientific methodology to that at all. It's simply  
15 an assumption. And he simply placed the key items in the  
16 diagram as, quote, "best he could." And by "key items," I mean  
17 the Finicum truck and the individuals -- the most important  
18 factors in this analysis.

19 With respect to Mr. Terpstra, he did lots of measurements,  
20 and there's lots of math-building models of the vehicles; but  
21 in the end, there was no measurement of the snowbank, and that  
22 is fatal. He subjectively placed the vehicles into the -- into  
23 his model. He subjectively placed models of human beings --  
24 not the human beings themselves, but models -- based on what he  
25 was told their heights were.

1 Did I turn it off here?

2 MS. OAKLEY: Ours are working. It's just that  
3 screen.

4 THE COURT: It says, "Failed to correct for lens  
5 distortion."

6 MR. CARY: Okay. So it failed to correct for lens  
7 distortion? And if -- if it -- only because I can't see it --  
8 I tell you what, I'll -- yeah, that would be -- can we do that?  
9 Thank you.

10 MS. FERGUSON: It's back.

11 MR. CARY: Oh, okay.

12 He failed to correct for lens distortion, and there's  
13 something in this analysis called the virtual camera. He  
14 placed it off -- he placed it in the wrong position by  
15 1,700 feet. About a third of a mile.

16 There's no testing done of this methodology. There are no  
17 applicable studies done. No applicable studies. There's no  
18 defensible error rate for this methodology used. It assumes  
19 the truck did not move for 20 minutes after the shooting,  
20 despite the fact that the truck was in gear with spinning  
21 wheels. People were moving and unloading from the vehicle, and  
22 there was a hot engine in a melting snowbank.

23 All added up, Your Honor, we believe this is  
24 unprecedented, in this particular set of circumstances, to use  
25 this technology in this way. We acknowledge that absolute

1 accuracy is not required, but there has to be a scientific  
2 validated error rate, and in this case there isn't one.

3 The plus-or-minus-5-degree cone is critical here. It's  
4 not been proven for the methods used in this case. It may work  
5 for the two-point method, but not for the methods used in this  
6 case.

7 The centering cone method is not appropriate. We think  
8 people will agree with that.

9 The rocker point method is subjective and highly sensitive  
10 to the -- the smallest little change will cause the -- the  
11 trajectory angle to be way off. The vehicles were placed  
12 subjectively, using human eye, and human models were in  
13 basically eyeballing. And, finally, we never received a  
14 meaningful report on frame selection and enhancement, which is  
15 inconvenient for us all, but it goes right to the heart of the  
16 scientific method. That's not scientific, not to do a report  
17 and not to take notes of the scientific analysis that you're  
18 doing.

19 Your Honor, the Innocence Project reports that 45 percent  
20 of wrongful -- exonerations or people that were really innocent  
21 that were convicted were convicted based on flawed forensic  
22 science. And that science wasn't necessarily done -- in fact,  
23 it was almost never done in bad faith. It was done in good  
24 faith. Everybody thought it was the right thing at the time.  
25 It was the best they had. But history has taught us that it

1 wasn't -- it wasn't appropriate. It wasn't scientifically  
2 validated.

3 The Innocence Project says on their website, quote,  
4 "Accuracy of a method should be established using large  
5 well-designed studies. Without these studies, the results of  
6 an analysis cannot be interpreted," end of quote.

7 The National Academy of Sciences has said the same thing.  
8 President Obama's Council of Advisors on Science and Technology  
9 said the same thing. The National Institute of Science and  
10 Technology said the same thing. You need a large well-designed  
11 study, and we don't have it here.

12 It's been suggested, Your Honor, in the public record, on  
13 more than one occasion, that perhaps this hearing -- by the --  
14 by the government, that perhaps this hearing isn't worth the  
15 public expense. There's been some reference to the public  
16 paying for Mr. Astarita's experts. And I want to set the  
17 record clear on that. We were now receiving Criminal Justice  
18 Act funding for Mr. Astarita's experts. That's because  
19 Mr. Astarita exhausted his personal savings in order to pay for  
20 the experts. He paid for them in the beginning. Counsel has  
21 not applied for CJA funding because we think it's so  
22 important -- the science, the validation, the fact that we  
23 think it is not validated is so important to the defense in  
24 this case that we've foregone funding for our fees or our  
25 expenses so that Mr. Astarita can have his day in court with



1 respect to this methodology.

2 THE COURT: I thought you reduced your fees to \$200  
3 an hour.

4 MR. CARY: Your Honor, that's true. If we're able to  
5 recover -- if we -- we have not collected any expenses or fees  
6 from him. That was the original arrangement because we thought  
7 that was the fee that the FBI would pay. We later learned that  
8 because of a regulation, they cannot pay. So if -- if, at the  
9 end of the day, the FBI can pay, they will; but as of today,  
10 Mr. Astarita has not paid for any of our expenses, has not paid  
11 for any of our fees, and we made that decision because we want  
12 to make sure that the funds go into these experts. That's  
13 the -- that's what we've done.

14 It's important -- that's -- we did that because it's  
15 important to us that -- that this science, applied in these  
16 circumstance -- it may be perfectly good for other cases, but  
17 it's not good for this case under these circumstances. We  
18 thought it was so important that we have this day in court, and  
19 that's why we made this decision.

20 It's important to us. It's important to Mr. Astarita. I  
21 would suggest because it's unprecedented to use in this way,  
22 it's also very important to our system of criminal justice.  
23 It's not been done before.

24 I thank you, Your Honor. I thank your staff, again, both  
25 for the hard work you've done before and the hard work ahead.

1 Thank you.

2 THE COURT: Thank you. We've got some imbalance  
3 here. I -- thank you, Counsel.

4 I -- the burden of proof is on the government to prove  
5 their case -- its case. The -- I think you may have been  
6 caught offguard, Mr. Sussman. Did you want to make a  
7 statement? In fairness, I'll allow you to make a rebuttal  
8 statement, if you choose to do so. I do have all of your  
9 briefing. I've heard it, but you might have some comments to  
10 make.

11 MR. SUSSMAN: I do, just briefly, Your Honor. I  
12 think the parties are in agreement about one thing, and that is  
13 there are really only two critical shots at issue in this case,  
14 and those are shots -- what we've all been describing as shots  
15 four and five. A total of eight shots were fired. We know who  
16 fired the first three. That trooper admitted it. We know who  
17 fired the last three. Those two troopers admitted it. What's  
18 at issue in this case is who fired rounds four and five.  
19 Because, to this very moment, nobody has admitted firing those  
20 shots. So that's what we're trying to determine here.

21 And because we don't have a witness who can say, "I  
22 personally saw who fired those shots" because everyone was  
23 focused on the threat -- and the threat was LaVoy Finicum and  
24 the people in his truck. They weren't looking at each other.  
25 They were focused on the threat. So we have to go with what we

1 have in this case, and that is largely circumstantial evidence  
2 and the forensic evidence.

3 With all due respect to Mr. Cary, who is very articulate  
4 and very passionate in his arguments to the Court, we disagree  
5 with a lot of what he has to say about the reliability of the  
6 expert testimony in this case and about the reliability of the  
7 work that they did in this case.

8 You're going to hear from Mr. Piazza who will described  
9 for you how it was he determined when the two gunshots  
10 occurred. Now, is he a gunshot analysis expert? He is not.  
11 He doesn't purport to be. He doesn't claim to be. But you're  
12 going to be able to hear, Judge, those two gunshots as they  
13 occurred, and it doesn't take an audio gunshot analyst to  
14 realize that those were two gunshots, especially when you  
15 consider that simultaneously, with those gunshots, debris comes  
16 through the roof of the truck, the left rear window shatters.  
17 If it walks like a duck and it quacks like a duck, it's a duck.  
18 And those are two gunshots.

19 The next issue is how did Mr. Piazza marry up those  
20 gunshots at that point in the Shawna Cox video with the FBI  
21 video, and he will describe and show the Court precisely how he  
22 did that.

23 Mr. Cary mentioned that there were two separate diagrams  
24 done in this case, and that's correct. Mr. Turpen's diagram  
25 was based on his own measurements at the scene, which were done

1 with a 3D laser -- I'm sorry, with a total station measuring  
2 device, and it was also based on the trajectory measurements  
3 done by Ms. Dickerson from the Oregon State Police Forensic  
4 Laboratory. She used the centering cone method. Mr. Haag used  
5 a slightly different method -- well, a different method. The  
6 rocker point method.

7       You know, I disagree with Mr. Cary that they're mutually  
8 inconsistent with one another. They are as to the vertical  
9 angle. And the deflection he referenced did occur, but it was  
10 after the bullet first struck the roof of Mr. Finicum's car and  
11 went into the -- into the cab. That's different than the angle  
12 that the bullet was traveling at when it first struck the roof.

13       Mr. Haag's measurement is more accurate as to the vertical  
14 angle that that bullet was traveling at when it first struck  
15 the roof. Ms. Dickerson's will be more accurate as to the  
16 vertical angle that it was traveling when it entered. But both  
17 of them, using their different technologies, came up with  
18 almost identical horizontal azimuth angles, and that's the  
19 critical angle in this case.

20       We know there wasn't anybody up in the trees shooting down  
21 at the car. So the fact that the horizontal angle is off on  
22 Ms. Dickerson's measurements is largely beside the point,  
23 because it's the horizontal azimuth angle that's critical,  
24 because that's what puts the cone right at Special Agent  
25 Astarita and Special Agent Astarita only. That's the critical

1 measurement. And with respect to that measurement, the two of  
2 them were 3 degrees off from one another.

3 Mr. Haag will testify as to how he does the rocker point  
4 method. He will demonstrate for the Court how he does the  
5 rocker point method. And you will see that it is not the  
6 willy-nilly subjective placement that the defense suggests it  
7 is. There's a very definite way that that rod fits into that  
8 deflection. What Mr. Haag calls "the rocker point," what  
9 others have called things like "the shoulder" or things like  
10 "the landing point." Various experts call it different things,  
11 but a number of different experts have used similar measures --  
12 similar methods to measure low-angle impacts like the one at  
13 issue in this particular case.

14 Mr. Haag will demonstrate for the Court how he did it, and  
15 you'll see how he did it. You'll see it is not a matter of a  
16 subjective feel. It's more a matter of that rod fits right in  
17 the landing, the landing groove there.

18 He'll also talk about the validation he's done on the plus  
19 or minus 5 degrees, including testing he's personally done  
20 since his -- since this case started.

21 Now Mr. Mugnier may be the godfather of photogrammetry,  
22 but that's analytical photogrammetry, and that's a different  
23 thing than what was used in this case. The analytical  
24 photogrammetry is an old-school way of doing it. Mr. Turpen  
25 used the 3D camera matching method of doing it. The software

1 he used to do that does a lot of the very same calculations  
2 Mr. Mugnier says have to be done, but it's done by the  
3 software, not by a person by hand. You'll see, because  
4 Mr. Turpen will demonstrate, how he did the camera matching,  
5 how things match up. How if you don't match it up properly, it  
6 will be out of kilter in the various different camera angles.

7 And you're going to hear about the supposed moving vehicle  
8 in the snow. It may have settled -- well, we believe it  
9 settled about 3 to 4 inches from the passenger side to the  
10 driver's side, but that truck was not sitting on top of a loose  
11 snowbank. It came plowing in there at better than 50 miles an  
12 hour. It buried itself nose first. It was up to the bedrails  
13 and up to the top of the wheel wells. The wheels were not  
14 spinning. The truck was not going anywhere. In fact, it was  
15 so deeply embedded in that snowbank that they broke a tow cable  
16 trying to get it out. They had to dig the front of the truck  
17 out and use two tow trucks to yank that thing out of there.

18 Nobody who was actually at the scene is going to say that  
19 that truck did anything but settle from passenger's side down  
20 to driver's side by about 3 inches. There was no yaw. There  
21 was no tilt. There was no roll. Just a slight settling from  
22 passenger's side to driver's side. Not enough to change  
23 anything.

24 So in the end, Judge, you're going to see and you're going  
25 to hear exactly how the government came up with its

1 methodologies and exactly how the government came up with its  
2 conclusions in this case, and those conclusions are  
3 sufficiently reliable so that that expert testimony can and  
4 should go to the jury.

5 THE COURT: Thank you.

6 MR. SUSSMAN: Thank you.

7 THE COURT: Let's take a recess until 10:30. Get  
8 your witnesses lined up.

9 (Recess taken.)

10 THE COURT: Please be seated. Call your first  
11 witness.

12 MR. SUSSMAN: Your Honor, the government calls  
13 Frank Piazza.

14  
15 FRANK PIAZZA,  
16 called as a witness in behalf of the Plaintiff, being first  
17 duly sworn, is examined and testified as follows:

18  
19 THE WITNESS: Yes.

20 DEPUTY COURTROOM CLERK: Thank you. You can be  
21 seated. Make sure you speak directly into the microphone and  
22 state your name and spell your name, please.

23 THE WITNESS: My name is Frank Piazza. That's  
24 spelled P-i-a-z-z-a.

25

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DIRECT EXAMINATION

BY MR. SUSSMAN:

Q. Mr. Piazza, how are you employed?

A. I'm a business owner of my own company.

Q. What is your company called?

A. My company is called Audio Paint, Ltd.

Q. And do you have a subsidiary that specializes in forensic work?

A. Yes, I do.

Q. What is that subsidiary called?

A. It's named Legal Audio Video.

Q. And are you the president of Legal Audio Video?

A. Yes, I am.

Q. And what is the nature of the forensic work that Legal Audio Video does?

A. We provide services handling audio and video materials for mostly the legal community, government agencies, investigators, insurance carriers, anyone who might need assistance with their audio and video.

Q. And what sort of assistance do you provide?

A. There are numerous services that we provide. It could be as simple as editing audio, taking longer portions of audio and creating smaller clips of audio. That would be the same with video.

We also enhance both audio and video using certain



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1 techniques. We also do authentication of certain files to  
2 determine if they have been changed, tampered, edited, things  
3 of that nature. We create trial exhibits. I will perform  
4 testimony where necessary. And we also provide other  
5 miscellaneous services, you know, for court presentation where  
6 necessary.

7 Q. Have you done forensic work in both civil and criminal  
8 cases?

9 A. Yes, I have.

10 Q. And in the civil cases you've done work on, have you done  
11 work on behalf of both plaintiffs and defendants?

12 A. Yes, I have.

13 Q. And in criminal cases, have you done work on behalf of  
14 both the government and criminal defendants?

15 A. Yes, I have.

16 Q. And, in fact, have you done work for the Williams &  
17 Connolly law firm before?

18 A. Yes, I have.

19 Q. And for either Mr. Cary or Ms. Ferguson, in particular?

20 A. Not those attorneys, no.

21 Q. But other attorneys in their firm?

22 A. Yes.

23 Q. What is the nature of the work you did for the Williams &  
24 Connolly firm?

25 A. Specifically, last year I was asked to do very similar

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1 services that I did for the government for this particular  
2 case, which was take video footage that was recorded, create  
3 numerous exhibits by enhancing that footage, extracting some  
4 images from that footage, and, additionally, overlaying  
5 graphics on that footage to help highlight certain areas they  
6 were interested in.

7 Q. Do you have the government's exhibit notebook on the  
8 witness stand in front of you there?

9 A. Yes, I do.

10 Q. And do you see the tab right at the beginning of that  
11 notebook with your name on it?

12 A. Yes.

13 Q. And could you take a look at the second tab in that  
14 notebook, the one that's labeled "CV," like "Charlie, Victor."  
15 Do you see that?

16 A. Yes, I have it opened.

17 Q. What is that document that appears there?

18 A. This is my most recent copy of my CV that I distribute.

19 Q. And is that a complete, fair, and accurate copy of your  
20 curriculum vitae?

21 A. Yes. For the most part, I do know that in the expert  
22 certification section there are other cases that have been left  
23 out, that are more recent, that have not been added.

24 Q. But, in general, the curriculum vitae lists the type of  
25 work you've done in the past?

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1 A. Yes.

2 Q. And for whom you've done that work?

3 A. That's correct.

4 Q. And it includes the list of the cases in which you've  
5 testified, and your testimony has been accepted as an expert  
6 witness?

7 A. Yes. There is one case I do need to be very specific  
8 about, if I may. It's *People v. Aaron Brian*. It was a *Frye*  
9 hearing. And specifically at that hearing I was asked to  
10 present certain scientific methodologies that were used for  
11 some techniques that the judge wanted to decide if they were  
12 going to allow that within that case. And, ultimately, the  
13 techniques were found to not be court accepted.

14 Q. And you were not allowed to testify as an expert in this  
15 case?

16 A. That's correct.

17 Q. And did the CV list, for example, articles that you have  
18 been involved in publishing?

19 A. Yes. There are two articles.

20 Q. And your professional memberships?

21 A. That's correct.

22 Q. Your education?

23 A. Yes.

24 Q. And your continuing training?

25 A. Yes.

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1 MR. SUSSMAN: Your Honor, Mr. Piazza's CV is already  
2 in the record. It was an exhibit attached to Defendant's  
3 Motion to Exclude Expert Testimony.

4 THE COURT: Yes, you may testify.

5 BY MR. SUSSMAN: (Continuing)

6 Q. Now, take a look at the next tab, if you would, please,  
7 Mr. Piazza. The one labeled "Reports."

8 A. Yes.

9 Q. Do you see -- what do you see there?

10 A. This is dated January 29, 2018, and it is a report  
11 describing my work, equipment, and software used.

12 Q. In this particular case?

13 A. That's correct.

14 Q. And do you adopt the contents of your report as part of  
15 your direct testimony here today?

16 A. I'm sorry. Would you repeat that?

17 Q. Do you adopt the contents of the report as part of your  
18 direct testimony here today?

19 A. Yes.

20 MR. SUSSMAN: Your Honor, this also was submitted to  
21 the Court, and it's in the record.

22 THE COURT: Yes, I have it. And, for the record,  
23 it's received.

24 MR. SUSSMAN: Thank you, Your Honor.

25 ///

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1 BY MR. SUSSMAN: (Continuing)

2 Q. Mr. Piazza, you were originally retained in this case by  
3 the United States Department of Justice, Office of the  
4 Inspector General, or OIG?

5 A. Yes.

6 Q. And when were you retained by OIG?

7 A. It was the spring before -- I'm sorry. It was the spring  
8 of the year of 2016. I believe the exact date where I started  
9 correspondence was on or around April 20th.

10 Q. And what exactly were you asked to do in this case?

11 A. I was asked to -- to examine multiple video files -- some  
12 with audio; some without -- and give as much information as I  
13 could about those files, create exhibits, sync one file to  
14 another file to create a new side-by-side playback, to extract  
15 images, to determine certain events within the audio, and  
16 create graphics to help highlight other areas, in addition to  
17 correct the stabilization issues of some of the video files  
18 that were present.

19 Q. And which -- can you describe the video files that the FBI  
20 gave you to work with? I'm sorry. The OIG gave you to work  
21 with.

22 A. Yes. Those files were personally handed to me by --  
23 with -- I believe it was Agent Russ Cunningham, and those files  
24 depicted air footage. I refer to those as the FBI files.  
25 Overhead air footage of the -- of the event.

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1           Additionally, there was -- it was initially described as  
2 camcorder footage that was actually made within the truck  
3 itself. We'll refer to that as the Shawna Cox video. And  
4 those were both given to me, as I mentioned before, on a hard  
5 drive.

6 Q.     So there were two video files from FBI airplanes?

7 A.     Yeah. There were actually more than two video files, but  
8 one was a continuation of the other. So I believe there were  
9 four files.

10 Q.    And what you described as a camcorder video, which we'll  
11 be referring to as the Shawna Cox video?

12 A.    That's correct.

13           Just to clarify, it wasn't really a camcorder. I believe  
14 it was an SLR-type camera that had video recording  
15 capabilities.

16 Q.    All right. But, in any event, we're talking about the  
17 Shawna Cox video?

18 A.    Yes.

19 Q.    And were you asked to merge or synchronize the video  
20 footage from the FBI planes and the video footage from the  
21 Shawna Cox video?

22 A.    Yes, I was.

23 Q.    And did the Shawna Cox video have an audio track on it?

24 A.    Yes, it did.

25 Q.    Did either of the two FBI aerial surveillance videos have

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1 audio tracks?

2 A. No. There were no audio files on those.

3 Q. So the only audio track was on the Shawna Cox video?

4 A. That's correct.

5 Q. Now, were you asked to identify certain events on the  
6 audio track of the Shawna Cox video?

7 A. Yes, I was.

8 Q. What, in particular, were you asked to do?

9 A. Specifically, I was asked to identify a number of gunshots  
10 that were present.

11 Q. Do you consider yourself an expert in audio gunshot  
12 analysis?

13 A. I'm not a gunshot analysis person. I find that that is a  
14 very different category than what I did here.

15 Q. And were you asked to do what you consider to be a gunshot  
16 analysis on the audio track of the Shawna Cox video?

17 A. No, I was not.

18 Q. Were you asked, for example, to determine the caliber of  
19 any weapon that had been fired?

20 A. No.

21 Q. Were you asked to determine whether the weapon that was  
22 fired was a rifle or a handgun?

23 A. No.

24 Q. Or whether there was more than one weapon fired?

25 A. No.

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1 Q. So what exactly were you asked to do with respect to those  
2 gunshots on the Shawna Cox audio track?

3 A. Identify them in the audio and use that audio to sync that  
4 with the FBI overhead video.

5 Q. All right. Let's talk about how you did that. What was  
6 the first thing you did in connection with that process?

7 A. So each file was recorded separately from each other. And  
8 they were handed to me in a file type that was not recognizable  
9 by my video editing system. It's Mac based, so I needed to  
10 convert those files to Mac files. So they were converted to  
11 .mov files at 30 frames per second, each separately of each  
12 other.

13 After those were converted, they were then -- they were  
14 imported into the video editing software called Final Cut Pro.  
15 And in Final Cut Pro I have the ability to start making  
16 observations and -- and determining if there are any anomalies  
17 or anything that could be used, you know, to pay attention to  
18 as I continued my analysis of the -- of the files.

19 So, specifically, I needed to go ahead and locate the  
20 start points of each video file and combine them or synchronize  
21 them together.

22 So there were certain anchors, certain visual cues that  
23 needed to be found in order to do that.

24 Q. Did you do that? Were you able to find those visual cues  
25 and anchors?



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1 A. Yes.

2 Q. And at some point did you listen to the audio track on the  
3 Shawna Cox video in an attempt to determine where those  
4 potential gunshots were fired?

5 A. Yes, I did.

6 Q. How did you do that?

7 A. Fortunately, to help aid my work, there were very  
8 distinctive visuals that went along with the audio that clearly  
9 placed confidence for me identifying the gunshot along with the  
10 visual.

11 Specifically, you mentioned before there were eight  
12 gunshots. Let's define those first three. What I identified  
13 were the visual strikes, not the actual -- the explosion or the  
14 report of the firearm. It's the strike at the car. The metal  
15 to metal.

16 So while those are being fired -- and they're very  
17 distinctive sounding -- those strikes are also identified by  
18 the people in the car. They know they're being shot at. Their  
19 dialogue presents that.

20 And there also is a cue where they're ducking. So they  
21 are aware they're being fired at. The shots were striking the  
22 car. So we identify them that way with that visual cue.

23 Q. And those were the first three rounds, you said?

24 A. Those were the first three rounds.

25 Q. You didn't identify the reports from the gunfire, the

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1 muzzle, discharges, or anything? Those were actually the  
2 bullet striking the truck?

3 A. That's correct.

4 Q. And what about the next ones?

5 A. Then there was another section we'll refer to as shots  
6 four and five. Those are fired. And when you hear the report  
7 and the -- the sound that they make, you can visually see the  
8 shrapnel, I guess, or the fabric that is the rooftop inside the  
9 car. A hole pierces the roof of the car in the passenger  
10 section in the backseat. It releases fabric and shrapnel from  
11 the actual roof area, and that continues through and shatters  
12 the passenger window, door window.

13 Q. And where do those events, those visual cues, occur in  
14 relation to what you are describing as the sound of gunfire?

15 A. They're almost simultaneous. But, you know, we -- I would  
16 understand -- and I'm not a firearms expert. If I were a  
17 hundred yards away and someone fired and then there was a  
18 report that we could hear -- I've had this happen at a baseball  
19 game. You know, the crack of the bat? You don't hear it, but  
20 you see it first.

21 So we're not a hundred yards away. We're, it looks like,  
22 roughly anywhere from 20 to 30 feet. So the microphone I place  
23 very near the -- the firearm that fires the bullets, and we  
24 hear them quite instantaneously, maybe a hundredth of a second  
25 difference where the bullet actually pierces the car itself.

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1 Q. And what about the final three shots?

2 A. We refer to those as six, seven, and eight.

3 Excuse me for a second.

4 Those shots, again, are identified by the events that are  
5 happening within the video. There is an exchange, and then the  
6 shots are fired. They have a very different sound, as far as  
7 the acoustics that accompany them, because they're further away  
8 from the microphone, and that's pretty standard that we would  
9 expect that.

10 Q. Did you do any enhancements to the audio track before  
11 listening for the sound of gunfire?

12 A. Well, enhancement was done to the entire audio track as a  
13 separate item from the actual -- using the audio to identify  
14 the gunshots.

15 Enhancement was done to help improve the dialogue  
16 playback, and that was done purely to see if there were  
17 other -- there was other information being said not only by the  
18 people within the truck, but outside. You can hear. If you  
19 listen closely, there are a lot of commands and shouting going  
20 on outside. We tried to boost those areas to lift them up so  
21 we could hear those differently, as well as if there were any  
22 noises or any distortion that might have been present in the  
23 dialogue, we try to reduce those, as well, with enhancement.

24 So the -- for dialogue purposes, we enhanced a version of  
25 the audio.

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1 Q. And what sort of enhancements did you do to the audio  
2 track?

3 A. It was quite minimal. I felt that, yes, there was  
4 distortion in the recording itself, and there were some  
5 overload areas in certain frequency areas. So we reduced those  
6 areas by rolling off certain frequencies in certain ranges.

7 We also boosted other frequencies in other frequency  
8 ranges that might produce more clarity to the voices. We also  
9 raised the amplitude level in quieter sections. When I say  
10 "we," I mean myself. I boosted the amplitude sections in  
11 quieter areas so we could hear those with a little more clarity  
12 as well.

13 Q. Now, did you keep detailed bench notes of the enhancements  
14 that you did as you were doing them?

15 A. No, I did not.

16 Q. And did your software keep track of those enhancements and  
17 the values of those enhancements as you were doing them?

18 A. So at times the -- the program I use is called Pro Tools,  
19 and if I were to export all of the text information in Pro  
20 Tools, it would tell me what tracks were used -- what filter  
21 setting -- I'm sorry. Not settings. What filters or plug-ins  
22 were attached to the tracks. It would not necessarily tell me  
23 what actual percentages I used as the user.

24 So we can get the information about what plug-ins were  
25 used and what kinds of filters were selected. It does not give

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1 you the actual value that I chose to use in my enhancement.

2 Q. So once you finish doing the enhancement to the audio  
3 track, what did you do then?

4 A. Well, that was just put on the side as a -- as something  
5 to review, and that was not used for any other purpose than to  
6 just review the dialogue.

7 Q. So how did you go about identifying the sound of gunshots  
8 on the audio track?

9 A. So going back to the original video, the audio track was  
10 on the Shawna Cox video. We have the ability -- as enhancement  
11 engineers, experts, we have the ability to get visuals of the  
12 audio and there are -- you can visualize audio as a waveform.  
13 You can visualize audio in a spectrographic image. There are  
14 softwares that produce these particular visuals.

15 So in addition to your ears, that whole first phase is  
16 what we refer to as critical listening. Using high-quality  
17 headphones and high-quality monitoring systems and a controlled  
18 environment to really listen and try to identify just with your  
19 own ears areas that need inspection or are interesting or are  
20 part of the goals that you're trying to achieve.

21 So in this case, to try to identify those gunshots, once I  
22 identify those areas and I was comfortable with that, I then  
23 would take a look at the actual audio in these different  
24 displays.

25 Q. And when you were engaging in this critical listening

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1 process, you used high-quality professional studio-grade  
2 headphones?

3 A. Yes.

4 Q. Did you play back the audio track at different speeds?

5 A. Sometimes. Sure.

6 Q. And then you checked the visual graphic displays of the  
7 audio track using either a waveform and/or a spectrograph?

8 A. Yes, that's correct.

9 Q. Is that a narrowband spectrograph or a wideband  
10 spectrograph?

11 A. I chose to use a narrowband spectrograph. If this was a  
12 pure analysis and it was about discovering, as you mentioned  
13 before, caliber-type certain behavior from certain distances  
14 where a lot of measurements were critical, I would have used a  
15 different spectrogram for this, but that was not the case.

16 Q. And what information were you able to get from the  
17 waveform analysis and the spectrogram?

18 A. A spectrogram, to people who don't know how to read one,  
19 is -- is a graphic that plots certain information that gives us  
20 details about audio. It shows the frequency, bandwidth. It  
21 has a time locator involved. It shows the energy or the  
22 pressure or the amplification, how different sounds react and  
23 how they look in a spectrogram.

24 For example, if you were to see a speaking voice in a  
25 spectrogram next to a voice of someone hitting a baseball, they

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1 would look very different in the spectrogram. They would have  
2 different frequency properties. One may or may not have  
3 harmonics. Harmonics are additional frequencies that are --  
4 that could be classified maybe as tones.

5 So we get a lot of information in a spectrogram, and it's  
6 set up in a typical XY axis. Different software creators have  
7 different ways of viewing them and different features.

8 Q. Now, did you record the spectrographic display of the  
9 audio track when the gunshots you heard occurred?

10 A. Yes, I did.

11 Q. And did you do that in both full speed and half speed?

12 A. I didn't do the actual recording in half speed. The full  
13 speed was recorded, yes, at normal speed. And then the half  
14 speed was then created in software.

15 Q. And did you also use graphics to label the points on the  
16 spectrograph at which you heard the gunshots?

17 A. Yes. That was done in addition to just the spectrographic  
18 without graphics as well, yes.

19 Q. And do you have those recordings with you today?

20 A. I do, yes.

21 Q. I'm going to ask you to play them for the Court, please.  
22 It's going to take us just a second to get your computer  
23 display up.

24 THE COURT: Are you going to need that easel?

25 THE WITNESS: No. I have everything on my laptop.

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1 THE COURT: Becky, will you move it?

2 DEPUTY COURTROOM CLERK: This one?

3 THE COURT: Just over there.

4 Becky, we're not getting an image up here for some reason.

5 DEPUTY COURTROOM CLERK: It will come on.

6 THE COURT: Let's pass it. Just go ahead.

7 THE WITNESS: Okay.

8 MR. SUSSMAN: Could you -- did you not want to see  
9 the display now, Your Honor?

10 THE COURT: I can see it right here, but we might  
11 have to call our IT guy to get this to work.

12 DEPUTY COURTROOM CLERK: It will come up.

13 BY MR. SUSSMAN: (Continuing)

14 Q. All right. Can you explain to us, please, what we're  
15 seeing at this point?

16 A. So this is a spectrograph image that was recorded, just  
17 for demonstration purposes, of the actual sounds that were  
18 present during that recording. And you can see some areas are  
19 brighter in color, some are darker, some have vertical from  
20 straight up to the bottom. And they all represent different  
21 sounds, as I mentioned before.

22 So if I were to play this, you'll see a -- you'll see a  
23 very thin line cross from left to right, and that is the actual  
24 time going by from left to right, and you'll see -- you'll hear  
25 the events as the -- the timer plays from left to right.



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1           At the bottom, you can see that I've extracted -- this is  
2 just a piece that begins at roughly 5 minutes and 22 seconds  
3 and --

4           THE COURT: Just a moment, please.

5           THE WITNESS: Yeah.

6           THE COURT: Will you call Houston, please?

7           DEPUTY COURTROOM CLERK: I've contacted him.

8           THE COURT: Will somebody?

9           Go ahead with your testimony. We'll get a visual for  
10 everybody else.

11           THE WITNESS: At the bottom, there -- I've taken a  
12 certain edit from the longer version of the video. So this is  
13 approximately 22, 23 seconds in length. Maybe a hair more.  
14 It's here to illustrate the very specific areas that we've been  
15 talking about. Gunshots one through eight.

16           In a little while, I'll also present to you another  
17 spectrographic from another software to show you another way of  
18 presenting it, which will -- one will confirm the other, if you  
19 will.

20 BY MR. SUSSMAN: (Continuing)

21 Q. All right. Will you go ahead and play that one, please?

22           MR. SUSSMAN: We'll call that Exhibit DH1A,  
23 Your Honor.

24           THE COURT: All right.

25                           (DH1A playing.)

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1 BY MR. SUSSMAN: (Continuing)

2 Q. Do you have a version of that that runs at a slower speed?

3 A. Yes, I do.

4 MR. SUSSMAN: We'll call this DH1B.

5 (DH1B playing.)

6 BY MR. SUSSMAN: (Continuing)

7 Q. Mr. Piazza, what was it about the spectrograph on both  
8 DH1A and DH1B that indicated to you that shots had been fired  
9 where you designated numbers four and five?

10 A. I'm going to open up in another program, which will give  
11 us a little bit more information, that will demonstrate the  
12 ability to really get very specific information that will help  
13 us to identify.

14 Q. And which program are you opening now?

15 A. I'm opening a program called -- hold on one second here,  
16 guys. It's called Sonic Visualiser. It's actually a free  
17 program. I wanted to demonstrate that these programs exist.  
18 There are many of them. There are dozens that you can get.

19 I apologize. Give me one moment.

20 Okay. Thank you. So I would like to just demonstrate.  
21 On the left side you can see the actual frequencies of the  
22 actual -- what was recorded from the original file, and it  
23 spans from zero at the bottom, and it takes its way all the way  
24 up to 11,025 hertz. These are all the areas that are captured  
25 in the visual that we can actually see in the layout of the

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1 graphic.

2 Q. Now, we'll call this one Exhibit DH1C.

3 Now, is that the same audio track that we just heard on  
4 the other spectrograph? DH1A and -B or a different file?

5 A. No. Well, this is taken from the original file that we're  
6 seeing in the actual software.

7 Q. So it's the same file?

8 A. It's the same file, but it hasn't been edited. It's the  
9 full file.

10 Q. All right.

11 A. So I'll play what this one looks like, and you can follow,  
12 and then I'll show you how I can quickly zoom in.

13 (Video played.)

14 THE WITNESS: I can zoom in on the materials, and you  
15 can get a very -- stronger views of the graphics. So, for  
16 example, in the center there, you can see the two vertical  
17 lines. Those being the -- the -- gunshots four and five. So  
18 when I play them --

19 BY MR. SUSSMAN: (Continuing)

20 Q. What makes you say that those are gunshots?

21 A. So my ear tells me, one. I also use the visual cues that  
22 we've described before of the bullet going through the hood --  
23 I'm sorry, the roof of the truck, to identify that something  
24 was fired.

25 The -- as I move the cursor up and down in this file -- I

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1 just want to go back a second and say that -- that this file is  
2 taken from the original -- the original video file; whereas,  
3 the file I just played before, which is the same content, is a  
4 converted file. That was converted from the original.

5 So this -- this playback here, when I roll the mouse in  
6 certain -- to the left, there are certain frequencies. You can  
7 see you get information in the upper right-hand corner, and  
8 that's telling us the actual time. So we can be very specific  
9 about the time that we hear these. It tells us a lot about the  
10 decibel levels at different frequencies. So nothing else  
11 visually, just in this particular screen that I'm showing you,  
12 has this much energy or sound pressure at all of these  
13 frequencies.

14 You know, you can see what I'm circling here is very  
15 different-looking than what I'm circling here as far as how it  
16 looks. It's the front end of this particular file in this  
17 spectrogram is very deliberate, almost like a brick wall;  
18 whereas, there is -- there it's gradual.

19 The other noises in the background, the ambience and  
20 shaded areas, those are all detected all within -- within the  
21 backgrounds of the other voices that you see; whereas, here,  
22 all throughout those frequencies, it's the -- the sound  
23 pressure is pretty high in decibel level, up and down; whereas  
24 you get very different fluctuations in these other files.

25 So, again, with your ears, you can see that there's

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1 nothing else producing this sort of pressure and energy in the  
2 recording other than those gunshots. So that's how I identify  
3 them as gunshots.

4 (Audio played.)

5 THE WITNESS: There they are playing back.

6 And if I were to compare these to the three at the end,  
7 they have very similar properties. The frequency ranges are  
8 very high in decibel level from top to bottom, and they produce  
9 that, what I described as like a brick wall visual at the front  
10 end, and that's the pressure and the energy that's being  
11 produced by the sound.

12 (Audio played.)

13 THE WITNESS: So there is my comparison there.

14 BY MR. SUSSMAN: (Continuing)

15 Q. Okay. Now, you testified earlier that you were asked to  
16 synchronize the Shawna Cox video with the FBI surveillance  
17 video. Were you able to do that?

18 A. Yes.

19 Q. And were you also asked to attempt to enhance either the  
20 Shawna Cox video or the FBI video?

21 A. Yes, I was.

22 Q. And how did you -- were you able to do that?

23 A. I was.

24 Q. And what did you do to enhance the Shawna Cox video?

25 A. The Shawna Cox video was imported into my software

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1 program. And within that program we have certain filters that  
2 enable us to change the lighting differences; work with the  
3 contrast differences; work with maybe color differences; use  
4 some sharpening differences, as well, where needed.

5 Q. What did you do to enhance the FBI videos?

6 A. My only focus during the enhancement was to -- excuse  
7 me -- was to focus on the actual debris or shrapnel of the  
8 fabric coming down from the roof inside the truck. That was  
9 the only thing that was worth paying attention to. Although,  
10 it was pretty clear without enhancement.

11 Again, this file did not require a lot of enhancement,  
12 visual enhancement, at all.

13 Q. You're talking now about the Shawna Cox video?

14 A. The Shawna Cox video.

15 Q. All right. But my question was what did you do to enhance  
16 the FBI video.

17 A. Oh, I apologize. I thought you meant the Shawna Cox  
18 video.

19 The FBI video, it's remarkable that we're able to get that  
20 imagery from, you know, so high up in the air. And I  
21 understand there were a few factors that were handicapping the  
22 visual of that. When you look at it with your own eyes, there  
23 is somewhat of a -- of kind of a frosting look to it. And it  
24 seemed to be toward the end of the day, so the lighting seemed  
25 to be reduced at that point. So it was my goal to just simply,

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1 with contrast, to darken the front of it a little bit, so it  
2 would take away that frosting or that image that seemed to be  
3 like a cloud over the front.

4 Q. Did you adjust the lighting level?

5 A. I did.

6 Q. How about the contrast level?

7 A. Yes.

8 Q. Did you do anything to stabilize motion?

9 A. Yes. That's a -- that was done as well. That was done  
10 manually, in fact.

11 Q. How so?

12 A. So most professional video softwares have an image  
13 stabilization filter or plug-in, if you will, that you can set  
14 the threshold, and it will try and fix the shake or the jitter  
15 of footage that could appear very choppy.

16 In the case of the FBI video, there are large swings from  
17 left to right, up and down; so image stabilization, typically,  
18 as a software application, wouldn't do the job. So this needed  
19 to be done manually.

20 Q. Did you do that?

21 A. I did.

22 Q. How about sharpening any of the video images at all?

23 A. Well, there were different sections that were -- where we  
24 use the sharpening technique to help bring better clarity to  
25 some of the images that were in the video. The sharpening

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1 didn't really affect the entire video, but at certain times  
2 we -- I felt it was necessary to try and use that technique.

3 Q. Did you have any success using it?

4 A. I believe so, yes.

5 Q. Okay. Did you keep detailed bench notes about the  
6 settings you used while you were enhancing either the  
7 Shawna Cox video or the FBI video?

8 A. I did not.

9 Q. Does your software log the settings that were used to  
10 enhance the video?

11 A. No, I was not able to generate any log of those settings.

12 Q. Okay. Now, once you enhance the FBI video and the  
13 Shawna Cox video, did you make an attempt to synchronize the  
14 two videos together?

15 A. Yes. The synchronization was done, but not with the  
16 enhanced copies. They were just done with the original copies.

17 Q. What steps did you take to synchronize the FBI video to  
18 the Shawna Cox video?

19 A. Well, in this case, there was only one way to do this, and  
20 we needed to find anchor points, visual cues that were exact in  
21 both videos. And when we located those cues or those anchors,  
22 we then were able to line up the videos where they both were in  
23 sync at that point.

24 Q. And at that point had they both been converted to run at  
25 the same rate of 30 frames per second?



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1 A. Yes.

2 Q. And what sort of things did you look for to use as anchor  
3 points?

4 A. Well, I went through looking for real obvious visual cues  
5 and that I could marry together. And once I found the visual  
6 cue in one video, I was able to make note of the time reference  
7 of it. And when I found the visual cue in the other video, I  
8 was able to make the time reference in that. So,  
9 independently, I knew that those two time references, when  
10 brought together and in line, would produce an in-sync  
11 playback.

12 Q. Now, did you note the particular individual frame numbers  
13 at that point?

14 A. Yes. In addition to the time, which was -- which was to  
15 the hundredth of a second, that was also converted to a frame  
16 number. The way that can be done is two ways. It's simple  
17 math. You can do the multiplication of 30 frames per second.  
18 So find how many seconds you are within your video and do the  
19 multiplication, or there's software that can toggle through  
20 very quickly and show you your results.

21 Q. And you said that the timer counter is accurate to one  
22 hundredth of a second?

23 A. In the case of Final Cut Pro, the software I use, it gives  
24 a frame count within 30 frames instead of a hundredth of a  
25 second. So, you know, for every ten frames, that would equate

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1 to a third of a second. 333. .333.

2 Q. So using the elapse timer counter, how difficult is it to  
3 locate the precise frames you used to synchronize the two  
4 videos?

5 A. Once you've identified the visual cues, you're comfortable  
6 those are reliable anchors, then once you notate from the  
7 visual what time reference you have or frame number you have,  
8 those can be used time and time again, and they can be synced  
9 together.

10 Q. But my question is is that if what you have noted is the  
11 time, the elapsed time on the counter, how easy is it for you  
12 to use that time that you've noted to go back and find the  
13 exact frame that you used to match up the two videos?

14 A. As long as I'm working with the same file and it hasn't  
15 been edited or changed, it will always be the same.

16 Q. And, in fact, were you able to go back and find the exact  
17 matching frames using the timer counter relatively quickly and  
18 easily?

19 A. Yes. Yes. I mean, you know, there are tasks you need to  
20 do within the software. If I create a new -- a new project  
21 within my software, it will take a few moments, but I know  
22 where I'm headed. There's a goal and there's an endgame.

23 Q. Now, were you able to determine the specific frame numbers  
24 you used to synchronize the two videos in this particular case?

25 A. Yes.

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1 Q. And did you take some screenshots of some of the frames  
2 you used to synchronize the two videos?

3 A. Yes.

4 Q. Now, in your exhibit notebook in front of you, can you  
5 turn to the tab labeled "Exhibits"?

6 A. Okay.

7 Q. Do you see Exhibit DH2-1 in front of you now?

8 A. Yes, I do.

9 Q. What is Exhibit DH2-1?

10 A. It is a picture of the FBI video showing the truck. And  
11 to the left of the truck I'm circling a wooden post marker.

12 THE COURT: I'm not seeing it, sir.

13 THE WITNESS: You don't see it?

14 THE COURT: No, right in front of you.

15 THE WITNESS: The judge doesn't have a copy.

16 THE COURT: Yeah. Well, no, no. You're supposed to  
17 show it to the -- in court.

18 THE WITNESS: Oh.

19 MR. SUSSMAN: Well --

20 THE WITNESS: So we have a printed copy.

21 BY MR. SUSSMAN: (Continuing)

22 Q. Right. There's a blue circle on the lower left side of  
23 that printed copy.

24 A. That's correct.

25 Q. That blue circle represents what?

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1 A. A sign post on the side of the road.

2 Q. Okay.

3 A. Or we'll refer to it as a pole, a wooden pole.

4 Q. Take a look at Exhibit DH2-2, please.

5 A. Yep.

6 Q. You see Exhibit DH2-2?

7 A. Yes, I do.

8 Q. And could you explain, please, what the blue circle is --  
9 first of all, Exhibit DH2-1, that was taken from the FBI video?

10 A. Yes, it was.

11 Q. What is Exhibit DH2-2 taken from?

12 A. This is taken from the Shawna Cox video.

13 Q. And there's a blue circle around the left upper center of  
14 the photograph there. What does that blue circle represent?

15 A. That is that same post that I identified in the FBI video.

16 Q. Take a look at DH2-3, please. What is Exhibit DH2-3?

17 A. This is illustrating that when the two videos are synced  
18 together, the Shawna Cox video being in the bottom left, the  
19 FBI video taking up most of the viewer, that I am demonstrating  
20 that that post is identifiable in both videos at that moment.

21 Q. And that's what those two blue circles represent?

22 A. Yes. That's correct.

23 Q. Take a look at Exhibit DH2-4, please. Is that the same  
24 image as DH2-3, just without the blue circles?

25 A. Correct.

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1 Q. And can you tell us, please, what frame number you used in  
2 the FBI video for that match comparison?

3 THE COURT: Need a pen?

4 THE WITNESS: No, I have it here, Your Honor. Thank  
5 you.

6 Did you ask for frame or time reference?

7 BY MR. SUSSMAN: (Continuing)

8 Q. Frame reference, please.

9 A. 700 frame.

10 Q. And in the Shawna Cox video, which frame is that?

11 A. Okay. I don't have -- I have the frame number from the  
12 video where these photos are taken from. I have to refer to  
13 a -- to a different video program in order to give that  
14 information. I don't have that here.

15 Q. All right. But, in any event, you have the timer notated  
16 to the hundredth of the second for both the Shawna Cox video  
17 and the FBI video?

18 A. Yes.

19 Q. Can you now take a look, please, at Exhibit DH2-5?

20 A. Okay. I have it.

21 Q. What is Exhibit DH2-5?

22 A. That is also the FBI video showing an image of Mr. Finicum  
23 exiting his truck.

24 Q. What are his hands doing in the video?

25 A. They're spread.

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1 Q. Can you take a look at DH2-6?

2 A. Yes.

3 Q. What is Exhibit DH2-6?

4 A. That is showing Mr. Finicum's left arm and hand in --  
5 within the blue circle.

6 Q. It's a little blurry at this point, is it not?

7 A. That's correct.

8 Q. Is it actually easier to see when you're watching the  
9 video?

10 A. I believe so, yes.

11 Q. Okay. What is Exhibit DH2-7?

12 A. That is illustrating that the footage from the Shawna Cox  
13 video is displaying the same image from a different vantage  
14 point in the FBI video. They're synced at that visual.

15 Q. And in both of them there is a blue circle around  
16 Mr. Finicum who is out of the truck with his arms to the side  
17 and slightly raised.

18 A. That is correct.

19 Q. And Exhibit DH2-8, is that just the same image without the  
20 blue circles?

21 A. Yes.

22 Q. And are all those fair and accurate representations of the  
23 screenshots of the videos that and the -- of the frames in the  
24 videos you used to match and synchronize the two videos?

25 A. Yes.

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1 MR. SUSSMAN: The government offers DH2-1 through -8,  
2 Your Honor.

3 THE COURT: They're received.

4 BY MR. SUSSMAN: (Continuing)

5 Q. Now, in preparing for your testimony today, Mr. Piazza,  
6 did you recheck the synchronized video to make sure the two  
7 videos were accurately synced?

8 A. I did.

9 Q. And what did you find?

10 A. I found that later on in the video there was a -- a frame  
11 error that occurred in the playback.

12 Q. Later in the video than what?

13 A. Than the events that we were just showing.

14 Q. Okay.

15 A. So roughly 20 seconds after the last shots were fired.

16 Q. After shots six through eight were fired?

17 A. Yes.

18 Q. And what about the accuracy of the synchronization when  
19 shots four and five were fired? Did you check that  
20 specifically?

21 A. I did.

22 Q. And what did you find with regard to those two shots?

23 A. They were very much in sync with -- the two videos were  
24 very much in sync with each other at that point.

25 Q. How about when the first three shots were fired?

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1 A. Very much in sync.

2 Q. And then when shots six through eight were fired?

3 A. Very much in sync.

4 Q. Sometime after shots six through eight were fired, the two  
5 videos somehow went out of sync?

6 A. They did.

7 Q. Do you have an explanation for how that happened?

8 A. I don't have a -- an exact explanation for what -- it  
9 can't be identified. I could not identify. Sometimes an  
10 anomaly can occur when files are converted or transferred from  
11 drive to drive, and I'm thinking something got corrupted at  
12 that point in the video. Therefore, that file, from that point  
13 I just described to the end of the file, is off roughly ten  
14 frames.

15 Q. Which is roughly one-third of a second?

16 A. That's right.

17 Q. Do you have with you the synchronized file that you did?  
18 I believe the file name is sany5242-law-audiofull.mov.

19 A. Would you repeat that, please?

20 Q. Do you have the synchronized video file with you?

21 A. I do.

22 Q. And is the file name for that video  
23 sany5242-law-audiofull.mov?

24 A. Yes.

25 Q. Could you play that, please?



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1 A. This file is -- plays back a very long time.

2 Q. Well, let's just go through the eight shots, and we'll  
3 stop there.

4 A. Okay.

5 (Video playing.)

6 BY MR. SUSSMAN: (Continuing)

7 Q. Now, the Shawna Cox video is in the bottom left corner of  
8 the frame?

9 A. Yes. The Shawna Cox video is in the bottom left. The  
10 full FBI overhead video -- part of the full viewer, unenhanced.

11 (Video playing.)

12 BY MR. SUSSMAN: (Continuing)

13 Q. Through each one of those shots we heard, that video  
14 synchronization is accurate?

15 A. Yes.

16 Q. And sometime after what we just watched is when you  
17 noticed there was a jump of about ten frames?

18 A. That's correct.

19 Q. In which video? The FBI video or the Shawna Cox video?

20 A. The Shawna Cox video.

21 Q. And were you able to go back and correct that  
22 synchronization after the fact?

23 A. Yes.

24 Q. But, to your knowledge, it was the original  
25 synchronization that Mr. Terpstra used in creating the 3D scene

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1 reconstruction in this case?

2 A. That's correct.

3 Q. Now, were you also asked to create video excerpts tracking  
4 the movements of individual operators shown on the FBI video  
5 during the critical moments both immediately before and after  
6 the fourth and fifth shots were fired?

7 A. Yes.

8 Q. How did you do that?

9 A. Specifically, we mentioned before about the shaky video  
10 and the jitter of the video. So that had to be stabilized  
11 first.

12 Once that was done, I was able to place a circle around  
13 each particular person to track them within the actual video  
14 footage.

15 Q. And the circles you used, were they different colors for  
16 each individual person?

17 A. Yeah.

18 Q. And how did you assign the colors to the different people?

19 A. Whatever I took next in the color bar.

20 Q. So they were random. They weren't assigned based on who  
21 the person was or which agency they worked for or anything like  
22 that?

23 A. No.

24 Q. It was just random?

25 A. It was random.

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1 Q. And did you know the individual identities of any of the  
2 operators on the ground when you placed the circles around  
3 them?

4 A. No, I did not.

5 Q. And did you use a red circle with respect to one of the  
6 operators on the ground?

7 A. Yes.

8 Q. And did you create a video excerpt of that operator with  
9 that red circle around his head?

10 A. Yes, I did.

11 Q. And in both full speed and slow motion?

12 A. Yes.

13 Q. Can you show us the full speed version first, please?

14 A. I'm going to open up another program to demonstrate that.  
15 Okay. This will be in normal speed.

16 Q. First of all, what program are you displaying there?

17 A. This is called Final Cut Pro.

18 Q. That's the editing software that you used to do your work  
19 in this case?

20 A. Yes.

21 Q. Go ahead, please.

22 (Video played.)

23 BY MR. SUSSMAN: (Continuing)

24 Q. Now, I noticed that what looked like overlaid graphic  
25 numbers were floating up and down and moving side to side. Can

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1 you explain what that was about?

2 A. So that's a result of the -- stabilizing the image and  
3 keeping it from shaking left and right.

4 The -- the graphics over those numbers that you see along  
5 the edges of the sides of the video, those were produced by the  
6 actual FBI footage. The original footage. They give  
7 information about height and -- and location that have nothing  
8 to do with what I'm doing. They're just there.

9 Q. So were they floating around because you focused on, in  
10 this case, the operator with the red circle around his face --  
11 around his person?

12 A. Right. They're floating around because the -- the frame  
13 is still move -- the image, video, is still -- there's movement  
14 going on, but I'm keeping that -- I'm centered on that one  
15 spot. So whatever happens around it will continue to move, but  
16 it will remain focused on that one area because the person  
17 moves around from corner to corner, top to bottom, but I'm  
18 putting it in the center.

19 Q. Okay. And can you show us the slow motion version of that  
20 same video, please?

21 (Video played.)

22 BY MR. SUSSMAN: (Continuing)

23 Q. That's probably good. Thank you.

24 Mr. Piazza, this Final Cut Pro software, is that what you  
25 used to match up and synchronize the two videos?

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1 A. Yes.

2 Q. Can you describe to the Court how you happened to select  
3 the frames and how you managed to marry up the two videos and  
4 synchronize them?

5 A. Yes. Let me think about this for a second.

6 I'm looking for a little bit of a shortcut so I don't have  
7 to go through the whole process.

8 You see down below there are two tracks that run left to  
9 right? In this case, these are duplicate tracks. But in the  
10 case of finding the sync points -- if, for example, the top  
11 track was the FBI track -- and we do see it in the visual here  
12 with the exception of the lower corner -- I would go through  
13 individually. So I'm going to speed up to the section where  
14 the actual moment where the gunshots happen.

15 (Video played.)

16 THE WITNESS: So right in that area. I can go frame  
17 by frame. You can hear audio. You can hear prior to the audio  
18 as I move forward.

19 BY MR. SUSSMAN: (Continuing)

20 Q. Go back about three frames to the left. Stop right there.

21 A. Yeah.

22 Q. Is that -- show us the frame that you actually used to  
23 match them up.

24 A. That frame is right there.

25 Q. Okay. But you could see in the frames immediately

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1 preceding it that Mr. Finicum is slowly raising his hands in  
2 the air?

3 A. Right. Understand once it's in sync, all movements and  
4 events will be in sync. It's now in sync from this point  
5 forward. Although, I did find an error, as I mentioned. But  
6 in those areas we don't have that issue.

7 So as move forward and I scan through and I hear the  
8 audio -- again, I'm taking this frame by frame -- you can hear  
9 right there that's the first -- right there is the first time  
10 you hear the gunshot.

11 You also, as a visual, with the bottom left, you see the  
12 glass shatter. If you look -- I'm actually going to zoom  
13 higher. If you look above the left corner of the window, on  
14 the left there, right above, coming down from the ceiling, you  
15 see debris and shrapnel. You can see it's pretty noticeable  
16 when the background is the actual -- the ceiling of the actual  
17 cab.

18 So that's the bullet coming through and shattering the  
19 window.

20 So that is where I am using visual cues as well as audio  
21 cues to tell me where I am and how I choose my frame.

22 So, for example, if I had the full FBI video here, which I  
23 mentioned a moment ago I don't have it loaded in, it would give  
24 me a time amount.

25 You can see, as I'm circling here, this is the time in my

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1 final cut that is telling me where it would be.

2 And to get the frame count, you would need to do the math.  
3 32 seconds at 30 frames a second. Do the math and  
4 multiplication, add 14 frames, or, very simply, that's why we  
5 have software, change the display to show what frame you would  
6 be.

7 So if this was the frame, which it is, but this is --  
8 again, this is in the synced version, the edit. I would make a  
9 notation that frame 974 from the FBI video is where I'll be  
10 syncing that frame to frame number -- whatever that same frame  
11 in the other footage is. When you line them up, they will play  
12 simultaneously with each other in tandem.

13 Now, where an error can occur is if my visuals are off a  
14 frame or two. I could set it up where they might be off maybe  
15 one or two frames. They will still run simultaneously with  
16 each other synced together, but they could be off if my visual  
17 cues are not as accurate as spot-on.

18 If my visual cues are right on and the -- and I'm  
19 confident I have the exact same view in the viewer, but because  
20 one was recorded from one camera and one was recorded from  
21 another camera, the very beginning of the frame may not be the  
22 very beginning of the same -- of frame number one from the  
23 other video. So it could have an overlap.

24 So if there were blocks of frames, it could just be  
25 slightly off. We're talking, you know, very miniscule amounts.

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1 But then they would be synced together.

2 So once you find the visual anchor that you're comfortable  
3 with, that you're sure that's it, then they stay locked from  
4 that point forward.

5 So that's what was done, and it was done at the moment,  
6 roughly, where the gunshots were fired. So if there was any  
7 error, we wouldn't notice it at that point at all.

8 And, as I said before, the error was detected 40 -- 30, 40  
9 seconds later.

10 Q. Before detecting the error, if you were to assign a rate  
11 of error to your original synchronized video, what would that  
12 rate of error have been?

13 A. I would have stayed in the three -- three frame rate  
14 error.

15 Q. Plus or minus?

16 A. Plus or minus three because of what I just explained. If  
17 my visuals were off, I could have missed something by one or  
18 two frames either way.

19 Q. But now after you found the anomaly in there, what would  
20 you say your rate of error is for that video?

21 A. Well, I would have to say that it is now ten frames.

22 Q. And ten frames is roughly one third of one second?

23 A. That's correct.

24 Q. Now, Mr. Piazza, the defense expert, Mr. Bruce Koenig, has  
25 leveled a number of criticisms at the work that you did in this



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1 case.

2 First of all, do you know Mr. Koenig?

3 A. I do.

4 Q. Are you familiar with his work?

5 A. Quite a bit of it, yes.

6 Q. And have you reviewed his declaration dated March 27 of  
7 2018?

8 A. Yes.

9 Q. Have you reviewed his supplemental declaration dated  
10 May 14 of 2018?

11 A. Yes.

12 Q. Now I would like to ask you some questions about some of  
13 the concerns he raised and some of the statements that he made  
14 in those two declarations.

15 First, he claims that you are not a qualified gunshot  
16 analysis expert and, in fact, you admitted as much during your  
17 telephone conversation with him, as you did here in court.  
18 What is your response to that criticism?

19 A. That's correct. I do not consider myself a gun analysis  
20 expert.

21 Q. Do you consider what you were asked to do in this case to  
22 be a classic gunshot analysis?

23 A. I don't believe this was gunshot analysis, no.

24 Q. Mr. Koenig claims that your audio analysis was limited to  
25 just generating spectrograms and audio exhibits and

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1 low-resolution waveform displays. Is that all you did?

2 A. Well, I explained before, you know, the different stages  
3 before we get to that point. The result, to try and simplify  
4 it and demonstrate it here in the courts and to you, is to  
5 create those exhibits, yes, of course; but there are steps  
6 taken, such as the critical listening part of that, determining  
7 certain features about the file types, how they're recorded.  
8 In this case, how many frames. You know, a lot of information  
9 goes into knowing what you're dealing with before you can  
10 produce these -- these graphics.

11 Q. And Mr. Koenig also criticizes you for using visual cues  
12 in doing your work. What's your response to that criticism?

13 A. I don't know how to respond to that. I mean, of course I  
14 use visual cues. I just said I did.

15 Q. In his March 27 declaration, Mr. Koenig writes that you  
16 and an OIG agent and a prosecutor all sat down together and, in  
17 his words, mutually decided to associate eight loud sounds on  
18 the Shawna Cox audio track with gunshots. Is that accurate?  
19 Is that what actually happened?

20 A. No, sir.

21 Q. What did actually happen?

22 A. Well, I kind of took you through a brief version of  
23 identifying everything in the recording, and I did all that  
24 work in full. And then we had later meetings and presented all  
25 of the information to the people who were present in those

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1 meetings.

2 Q. The prosecutor and the agent?

3 A. That's correct.

4 Q. And was it a matter of them agreeing with your -- the work  
5 that you had already done, or was it the three of you getting  
6 together and deciding together where the eight gunshots were on  
7 the audio track?

8 A. No, it was agreement. It was agreement after my work. We  
9 didn't sit down and you didn't look over my shoulder and tell  
10 me what to do, and, no, it was not the case at all.

11 Q. Okay. And Mr. Koenig writes that based on your  
12 spectrograms and your audio exhibits and the waveform displays  
13 alone, he was unable to scientifically associate any part of  
14 the Cox video with gunshots as opposed to other loud noises.  
15 But in identifying the sounds of gunshots on the Cox video, did  
16 you rely on things other than just the spectrograms, the audio  
17 exhibits, and the waveform displays?

18 A. Yes, I did.

19 Q. Such as?

20 A. Well, very obvious visual cues, such as the bullet coming  
21 through the roof of the truck, the shattering of the window,  
22 the reactions to the people while the shots are being fired.

23 Q. And Mr. Koenig also criticizes you for not providing him  
24 with exact frame numbers of the frames you claimed were matches  
25 between the FBI video and the Shawna Cox video. But did you

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1 provide him with any point of reference for what you used to  
2 match the two videos and synchronize them?

3 A. I did. In fact, I -- while on the phone conversation, I  
4 opened up one of the files and -- it was not Final Cut Pro. It  
5 was a different playback software -- and gave him the time  
6 locations to the hundredth second.

7 Q. And since reading Mr. Koenig's criticisms, were you able  
8 to go back and locate the precise frame numbers you used to  
9 synchronize the two videos?

10 A. Yes.

11 Q. Using the timer counter?

12 A. That's correct.

13 Q. How difficult was it for you to do that?

14 A. It was not difficult at all once I loaded the proper file  
15 in and was able to find those areas.

16 Q. And Mr. Koenig also criticizes you for not providing him  
17 with the specific settings you used while enhancing the videos.  
18 Did you tell him what sort of enhancements you had done?

19 A. I told him that I enhanced some of the video that was --  
20 the FBI -- I don't think I said specifically "FBI video." I  
21 did enhance video and extract images.

22 Q. Did you tell him the sorts of enhancements you performed?

23 A. I did.

24 Q. As well as the types of adjustments you made?

25 A. I did.

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1 Q. Did you also tell him the specific software that you used  
2 to do those enhancements?

3 A. Yes. I was very specific about mentioning the filters  
4 from Final Cut Pro. I was very specific about the different  
5 plug-ins and filters in Pro Tools for the audio and general  
6 settings as well.

7 Q. Did you offer to share the settings from the software with  
8 him?

9 A. I did.

10 Q. And Mr. Koenig notes that your synchronization of the two  
11 videos differs from an independent synchronization of the two  
12 videos that was done by somebody at the FBI.

13 Have you reviewed the FBI's synchronization of the two  
14 videos?

15 A. I have not reviewed it fully, but I've seen it played  
16 back, yes.

17 Q. And, in your opinion, is the FBI synchronization accurate?

18 A. Not as accurate as mine, no.

19 Q. And what do you base that on?

20 A. Again, the visual cues were off; therefore, everything  
21 else did not fall into line. The audio did not line up with  
22 the visual cues.

23 Q. And did you base your synchronization on the  
24 synchronization that was done by the FBI?

25 A. Not at all.

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1 Q. Were you asked to look for anything like a muzzle flash or  
2 muzzle recoil visible on the FBI video?

3 A. Yes, I was.

4 Q. And did you look for those things?

5 A. I did.

6 Q. Were you able to find any of them?

7 A. I could not.

8 Q. Why, in your opinion, were you not able to see either a  
9 muzzle flash or a muzzle rise in the FBI video?

10 A. The quality of the video would just not allow that certain  
11 detail.

12 Q. And how about the distance that the FBI plane was from the  
13 incident?

14 A. Well, that -- when I say "quality," I mean things such as  
15 distance and the -- just the images it produced.

16 Q. Now, Mr. Koenig notes that the FBI video is blurry and  
17 shaky, but you said you did some manual image stabilization?

18 A. Yes.

19 Q. And we saw the results of that in the video with the red  
20 circle around the one operator?

21 A. Yes.

22 Q. Mr. Koenig also notes a number of other factors that  
23 affect the clarity of the FBI video, such as the lighting  
24 conditions, the video compression, lens distortion, and camera  
25 artifacts.

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1 Did you notice any of those factors present in the FBI  
2 video?

3 A. Yeah. At times they did show up, sure.

4 Q. Were you able to compensate or adjust for at least some of  
5 those factors?

6 A. Yes. For some of those factors, yes.

7 Q. And was there enough detail left that you were able to put  
8 together a usable video?

9 A. Absolutely.

10 Q. And was there enough detail in the FBI video that you used  
11 to do the synchronization to allow you to accurately  
12 synchronize it with the Shawna Cox video?

13 A. Yes.

14 Q. Now, in a supplemental declaration, Mr. Koenig suggests  
15 that your use of sharpening actually changed the FBI video by  
16 altering the pixels and adding artifacts to the image that did  
17 not exist in the original file.

18 What is your response to that?

19 A. I think sharpening is a technique that needs to be used  
20 very carefully. I'm not sure which images were reviewed where  
21 that conclusion had come, but we had goals. Remember, we  
22 produced hundreds and hundreds of images, and each one we  
23 looked at different versions of enhancement to see what maybe  
24 was revealed and what was not revealed.

25 Sharpening, if overused, can distort the certain edges of

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1 different images if the contrast allows it. The pixels are,  
2 we'll say, rearranged, shifted, if you will, but only in those  
3 areas where the sharpening is being applied too much. You have  
4 to be very careful about where the threshold is.

5 And that is something I think the eye can take care of in  
6 how you view it to see if you have gone beyond the threshold  
7 where you are creating artifacts that might not be necessary.  
8 But, again, those artifacts only remain in those edged areas.

9 They can also make the pixels themselves, the edges of the  
10 pixels themselves, more apparent in the view.

11 Q. But you said that when you did that, the synchronized  
12 video, you used the unenhanced versions of both the Shawna Cox  
13 video and the FBI video?

14 A. That's correct.

15 Q. So there's no sharpening used in the synchronized video at  
16 all?

17 A. No.

18 Q. Would any of the enhancements that you made, including the  
19 use of sharpening, have, say, added a vehicle to the image or  
20 to the video that wasn't there before?

21 A. No.

22 Q. Would it have added a person where one did not exist  
23 before?

24 A. No.

25 Q. Would it have removed a vehicle or a person from the



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1 video?

2 A. No.

3 Q. Would it have moved the position of a vehicle?

4 A. No.

5 Q. Or the position of a person?

6 A. No.

7 Q. How about the use of image stabilization? Would that have  
8 added or moved a person?

9 A. No.

10 Q. Or a vehicle?

11 A. No.

12 Q. How about the enhancements you made to the audio track of  
13 the Shawna Cox video? Would those have changed the overall  
14 content of the audio track?

15 A. The content would remain the same.

16 Q. And would those enhancements have added any gunshots where  
17 they did not previously exist?

18 A. No.

19 Q. Or change the timing of the gunshots to a different part  
20 of the audio track?

21 A. No.

22 Q. Mr. Piazza, can you say to a reasonable degree of  
23 audio/visual certainty that the time -- at the time shots four  
24 and five were fired that your synchronization of the two files  
25 was accurate?

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1 A. Yes.

2 THE COURT: Becky, would you call the marshals to get  
3 the marshals for the next --

4 DEPUTY COURTROOM CLERK: I think they're here.

5 THE COURT: The interpreter is here.

6 DEPUTY COURTROOM CLERK: Everybody is here.

7 THE COURT: Yeah, I'm ready to go.

8 MR. SUSSMAN: Your Honor, I believe that the two  
9 videos that we saw with the red circle on them are in as part  
10 of Exhibit G; but, in any event, we'll be happy to have  
11 Mr. Piazza create a separate disk for us which we can submit to  
12 the Court by the end of the hearing, and we would offer them if  
13 they're not already in the record.

14 THE COURT: They will be received.

15 MR. SUSSMAN: Thank you. I have nothing further.  
16 Thank you.

17 THE COURT: We're going to take our recess. I have  
18 another matter. We're in recess. You can stand.

19 (Lunch recess taken.)

20 THE COURT: Have a seat, everybody.

21 MR. SUSSMAN: Your Honor, before we begin this  
22 afternoon, I just did want to clarify one thing, and that is  
23 the -- three of the videos that Mr. Piazza played during his  
24 direct examination are, in fact, in the record already in  
25 Government -- in Exhibit G to the government's supplemental

1 response. The full synchronized video appears under the file  
2 name wja\_0000002.wmv, and the red circle video appears at  
3 wja\_0000007.mov.

4 THE COURT: Who is the red circle supposed to  
5 represent?

6 MR. SUSSMAN: That would be defendant, Your Honor.

7 THE COURT: Thank you.

8 Counsel?

9 MR. CARY: Thank you, Your Honor. One brief  
10 housekeeping matter for us. So long as the same rules apply to  
11 the government and the defense, we're willing to withdraw  
12 Mr. Jason's declaration which we were asked to do. Of course,  
13 if there are any government witnesses who don't testify, we'd  
14 ask that the same rules apply to them.

15 THE COURT: Another housekeeping matter. I suggested  
16 to counsel that only in your discretion, not a mandate from the  
17 Court, that you can use the direct examination from the reports  
18 without laboriously going into it, but I didn't mean to exclude  
19 you doing direct. This is case law backing that up, but it's  
20 totally discretionary.

21 Thank you, Counsel.

22 MR. CARY: Thank you, Your Honor.

23

24

25

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CROSS-EXAMINATION

BY MR. CARY:

Q. Mr. Piazza, my name is Rob Cary, and I represent Agent Joe Astarita.

You attended the Berklee College of Music?

A. Yes, I did.

Q. And that's in Boston?

A. Yes, it is.

Q. You began your career as a songwriter?

A. That's correct.

Q. And in order to get songs published, you needed to make demo records; correct?

A. That's correct.

Q. And in order to do that, you had to rent recording space; right?

A. Sometimes yes; sometimes no.

Q. Is it true, sir, that you bought your own recording equipment so you wouldn't have to rent recording space?

A. Yeah, that's true.

Q. And you opened up a recording studio for the music industry. True?

A. I did, yes.

Q. And that's been successful?

A. Yes, it has.

Q. I believe I've read where you've recorded some Grammy

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1 Award-winning performances?

2 A. Clients have come through that have had some success, yes.

3 Q. And you also do voiceover work, sir; correct?

4 A. That's correct.

5 Q. What's voiceover work?

6 A. The service we provide is taking a lot of actors, folks  
7 like yourself, who have good voices, who are interested in  
8 learning how to market themselves as voiceover professionals or  
9 at least dip their toe in the water and have an opportunity to  
10 be hired for using their voice. So companies were created for  
11 that.

12 Q. That's a successful business, as well, that you have?

13 A. Yes.

14 Q. At some point when you had this recording studio, you were  
15 approached by a lawyer by the name of Gerald Lefcourt; correct?

16 A. That's correct.

17 Q. And he's a defense lawyer; correct?

18 A. Yes.

19 Q. Well-known New York City criminal defense lawyer. True?

20 A. Yes.

21 Q. He told you he had a bunch of audiotapes that were in  
22 analog format that needed to be converted to digital; correct?

23 A. That's correct.

24 Q. And you worked with Mr. Lefcourt and the prosecutors in  
25 that particular case that Mr. Lefcourt had, and you converted a

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1 bunch of recordings into digital format; right?

2 A. That's right.

3 Q. And you worked -- you did that -- both parties -- the  
4 government and the defense -- agreed to the methodology that  
5 would be used in that instance; right?

6 A. That's correct.

7 Q. And you met a number of agents along the way while you  
8 were doing that. True?

9 A. Agents, as in FBI agents?

10 Q. Law enforcement agents.

11 A. Yes, that's correct.

12 Q. And you met some prosecutors?

13 A. Sure.

14 Q. You met some defense lawyers?

15 A. Yes.

16 Q. And another business was launched; correct?

17 A. It was a great opportunity at the time.

18 Q. So you really have -- you have three businesses. You have  
19 your music recording business, you have your voiceover  
20 business, and you have your legal business; correct?

21 A. That's correct.

22 Q. Do you have an engineering degree?

23 A. No, I don't have an engineering degree, no.

24 Q. Do you have a -- an advanced degree in forensic science?

25 A. No, I do not.

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1 Q. Do you have any sort of college degree in science at all?

2 A. No, I do not.

3 Q. Do you have a college degree, sir?

4 A. I never graduated from college.

5 Q. Have you ever been an employee of a law enforcement  
6 agency?

7 A. No.

8 Q. Have you ever been trained by a law enforcement agency?

9 A. No, I have not been trained.

10 Q. Have you ever been an apprentice for a forensic scientist?

11 A. No.

12 Q. Have you ever worked for a forensic scientist?

13 A. No.

14 Q. And, in fact, you do not consider yourself a forensic  
15 scientist, do you, sir?

16 A. I don't consider myself a scientist.

17 Q. Have you ever authored any peer-reviewed papers for  
18 academic journalism in the field of forensic sciences?

19 A. I have not.

20 Q. And the only coursework that's listed on your resumé is a  
21 course on forensic authentication of digital audio; correct?

22 A. That's correct.

23 Q. And that course did not address the analysis of gunshot  
24 audio, did it?

25 A. No, it did not.

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1 Q. And you admit, sir, you're not an expert on gunshot  
2 analysis; correct?

3 A. That's correct.

4 Q. Now, you were correct -- you were contacted in April of  
5 2016 to work on this particular case; right?

6 A. Yes, that's right.

7 Q. You were contacted by Agent Russell Cunningham and Agent  
8 Nicole Flemming of the Inspector General's Office of the U.S.  
9 Department of Justice; correct?

10 A. Yes.

11 Q. And they provided you some materials. True?

12 A. Yes.

13 Q. They gave you an overhead video taken by the FBI; correct?

14 A. Yes, that was one of the videos.

15 Q. In fact, there were two FBI videos, overhead videos;  
16 correct?

17 A. Yes.

18 Q. And they gave you a video taken inside the car with I  
19 think you said a camera that was able to record video; correct?

20 A. Yes.

21 Q. And I said the car. Actually, Mr. Finicum's truck;  
22 correct?

23 A. I'm assuming it's Mr. Finicum's truck.

24 Q. What else did they provide to you?

25 A. Well, there were a few videos. There was a version of the



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1 syncing video done by -- I forget the person's name. I think  
2 his name was -- his first name was Zach, who was an employee  
3 locally, I believe, and there were some photographs.

4 Q. Did they provide you any analysis of the case?

5 A. Explain what you mean by "analysis."

6 Q. Any -- any work product that reflected what their theories  
7 were or what they believed actually happened.

8 A. I don't believe so.

9 Q. What did they explain to you about what they wanted you to  
10 do?

11 A. They were interested in having me go through the videos to  
12 first see if there was anything about those -- the content of  
13 the videos that was out of the ordinary. They wanted me to  
14 identify gunshot sounds. They also asked me to merge the  
15 videos together, to listen to the audio, to see if there was  
16 anything in the conversations, create numerous exhibits, some  
17 that we've seen today, and many others.

18 Q. Did they ask you to prepare a report for this case?

19 A. I was asked to prepare a report at a later stage. My work  
20 was done in, I guess, the year 2016, for the most part. And  
21 then it was revisited again much later, so toward the -- I  
22 think toward the end of 2017, early 2018, that discussion came  
23 up.

24 Q. Who asked you to prepare a report?

25 A. I believe it was Mr. Sussman.

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1 Q. And when did he ask you to prepare a report?

2 A. I believe it was either the end of 2017 or early 2018.

3 Q. After -- and you, in fact, prepared a report; correct?

4 A. Yeah, I -- I prepared a report that had some general  
5 information in there about my work.

6 Q. And we'll look at that in a minute, but it was dated  
7 January 29, 2018; correct?

8 A. I would have to see it in front of me.

9 Q. I'll show it to you in just a second.

10 After that report that you, in fact, prepared, were you  
11 ever asked to prepare another report?

12 A. No.

13 MR. CARY: If I could have Exhibit 1-02 on the  
14 screen, please.

15 BY MR. CARY: (Continuing)

16 Q. Is that your report, sir, dated January 29, 2018, that you  
17 prepared for this case?

18 A. It appears to be the first page, yes.

19 Q. And if I could focus on the last paragraph of that page.  
20 You write there, do you not, sir, that "I was asked to review  
21 all video materials, enhance, edit, merge, and create new  
22 versions or edits from the master files."

23 Did I read that correctly?

24 A. Yes.

25 Q. And then it says, "Additionally, I was asked to review all

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1 of the materials" -- I'm sorry -- "all audio materials,  
2 enhance, edit, and perform analysis on certain sections of the  
3 audio."

4 Did I read that correctly?

5 A. Yes.

6 Q. And those were your words; right?

7 A. Yes.

8 Q. And then if we go to the next page, the very first  
9 paragraph, it begins, "Specifically, it was requested that I  
10 merge and sync the audio from camcorder video footage with  
11 video taken from an overhead source to create a new, combined  
12 version." Correct?

13 A. That's correct.

14 Q. That's the syncing that you talked about this morning?

15 A. Yes.

16 Q. Then it goes on to say, "I was also asked to perform  
17 analysis on the audio to determine and confirm certain events."

18 My question for you, sir, is what events were you asked to  
19 determine and confirm?

20 A. Whether or not there were any gunshot sounds audible in  
21 the recording.

22 Q. And that's the work you spoke about this morning as well;  
23 correct?

24 A. Yes.

25 Q. Now, you used the word "confirm" in that report. Why did

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1 you use that word?

2 A. Never put much thought to it.

3 Q. Did you know that it was the government's theory that  
4 there were eight gunshots fired at the scene?

5 A. I believe so.

6 Q. When did you learn that?

7 A. Early on in the process.

8 Q. From whom did you learn that?

9 A. From Mr. Cunningham.

10 Q. It goes on -- your report goes on to say, "I received  
11 instruction and details from you and the Offices of OIG on  
12 where to focus my work."

13 Did I read that correctly?

14 A. Yes.

15 Q. And what were you told about where to focus your work?

16 A. Specifically, there was a section where Mr. -- where he's  
17 driving his car into the area where the gunshots take place, so  
18 that particular area.

19 Q. And the work that you did with respect to gunshots, you  
20 testified this morning about spectrograms that you used;  
21 correct?

22 A. Yes.

23 Q. And those were narrow-based spectrograms; correct?

24 A. Narrow -- yes, narrowband.

25 Q. Narrowband.

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1           You also showed -- actually, you didn't. Did you use  
2 waveforms in this case?

3       A.    I did.

4       Q.    What's a waveform?

5       A.    A waveform is another visual generated by an audio program  
6 to see very basic information about an audio file.

7       Q.    And you used what are called low-resolution waveforms;  
8 correct?

9       A.    Yes, that's correct.

10      Q.    And did you do any analysis of -- let me ask you this: Do  
11 you know what an N-Wave is?

12      A.    I believe I've done some research on what an N-Wave is.

13      Q.    What is an N-Wave?

14      A.    I understand it to be a secondary sound that gets picked  
15 up by a microphone as a bullet passes by the microphone.

16           THE COURT REPORTER: Can I clarify? Is it "N" or  
17 "in" or "end"?

18           MR. CARY: "N" as in "Nancy."

19      BY MR. CARY: (Continuing)

20      Q.    And in this particular case you're asked to look at what  
21 you identified this morning as shots four and five; correct?

22      A.    Yes.

23      Q.    Did you do any analysis, sir, to determine whether there  
24 was an N-Wave present?

25      A.    No. As I said earlier, I did not do any analysis on any

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1 of the gunshots, specifically, to talk about their details or  
2 their makeup or firearms or comparisons, things of that nature.

3 Q. What's a reverberation event? Do you know what a  
4 reverberation event is?

5 A. I think it can be interpreted differently. In my case, it  
6 would be "reverb" meaning -- to simplify it, an echo. The  
7 sound of this room has reverb. If we stand in the hallway,  
8 there's reverb.

9 So the -- the -- if something is -- if there's a striking  
10 sound, the reverb will have a tail, and it will continue on,  
11 and for the length of the ability of the microphone to capture  
12 that.

13 Q. Did you do any analysis to determine whether there was any  
14 reverb or whether there's a reverberation event in connection  
15 with what you labeled shots four and five?

16 A. I did not.

17 Q. You mentioned visual cues in your testimony this morning;  
18 correct?

19 A. Yes, I did.

20 Q. And one of the visual cues you used, you talked about  
21 sparks in an automobile and a shattering window; correct?

22 A. That's correct.

23 Q. Did that -- those visual cues indicate to you one shot or  
24 two shots or -- or something else?

25 A. When I see it, it seems like one shot to me.

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1 Q. Did you have any visual cues, indicating there were two  
2 shots?

3 A. No.

4 Q. Now, you spoke about shots four and five this morning.  
5 Were you asked to decide a particular -- or choose a particular  
6 frame for one of the shots or the other shot?

7 A. No. The first shot was the first frame that was chosen.

8 Q. Meaning shot four --

9 A. That's correct.

10 Q. -- in your terminology?

11 So you did work to choose shot -- the exact frame or the  
12 precise frame that shot four was fired at; correct?

13 A. That's correct. The shots happened so close to each other  
14 that I don't think they were able to get their own frames.  
15 That could be incorrect, though. I'm going to stick with just  
16 the fact that I believe that it's just the first shot. Once  
17 that's identified, from that point forward, the second shot is  
18 audible. That's how I treated it.

19 Q. How far apart were those two shots?

20 A. They were roughly two tenths of a second. I'll just kind  
21 of throw that out there.

22 Q. In your professional career, had you ever been asked to  
23 choose a frame to coincide with a particular gunshot before?

24 A. You mean a syncing? Similarity to this? Similar?

25 Q. I'm talking about the end product of your work was to

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1 choose a frame that coincided with shot number four, in your  
2 terms; right?

3 A. Yes, that's right. Yeah.

4 Q. Had you ever had occasion to do that before, say, to  
5 testify in court?

6 A. No.

7 Q. Had you ever had the opportunity or occasion to do that in  
8 any kind of forensic setting?

9 A. I have many times synced many independent videos with  
10 independent audio to create new audios. That has happened many  
11 times for many cases.

12 Specifically a gunshot? No.

13 Q. And I understand you had no experience doing that. Did  
14 you have any training in how to do it?

15 A. Training in how to sync a video together?

16 Q. No. I'm sorry. How to choose a frame to coincide with a  
17 gunshot.

18 A. Well, if you look at the gunshot as possibly any sound  
19 that is identifiable, any sound or gunshot will be relevant to  
20 the frame that it happens on. So I don't find the fact that a  
21 gunshot versus somebody dropping a large item on the floor,  
22 they'll both have a time reference, and they can both be  
23 identified.

24 So this is -- from my approach, this was not about  
25 synchronizing a gunshots to a frame. It was about



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1 synchronizing a sound that was very audible that could be  
2 placed on a frame.

3 Q. Did you follow any published procedure in doing this work?

4 A. No.

5 Q. Did you keep notes of what you were doing when you did  
6 this work?

7 A. No, I did not keep notes.

8 Q. I'd like to show you what we understand is your synced  
9 video, which I think you showed this morning, which was Grand  
10 Jury Exhibit 34B and I believe our Exhibit V-02, and I would  
11 like to show it to you sort of frame by frame. Can we pull  
12 that up?

13 Does this appear to be that video?

14 A. You'll have to play it.

15 (Video playing.)

16 THE WITNESS: You'll have to play it some more.

17 BY MR. CARY: (Continuing)

18 Q. Okay. Sure.

19 (Video playing.)

20 BY MR. CARY: (Continuing)

21 Q. Is that what that appears to be, sir?

22 A. Yes. I want to point out you're playing a version which  
23 is a compression called MP4, and we did not present that same  
24 version today, but that was included earlier. It's just a --  
25 another copy in a different format.

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1 Q. Let me do this -- it actually might work better. Do you  
2 have the ability to play that, as we did this morning, for us?

3 A. I could do that.

4 Q. Could I ask you to do that? And could I ask you to -- I  
5 want you to stop, if you could, on the frame that you believe  
6 coincides with shot number four.

7 A. Okay. I need to plug this in. Okay.

8 Q. Could I ask you to play that, and could I ask you to --  
9 however you have to do it, but to -- to either slow it down or  
10 go frame by frame and then stop on the particular frame that  
11 coincides with shot number four, please.

12 (Video playing.)

13 THE WITNESS: There it is.

14 BY MR. CARY: (Continuing)

15 Q. Does that show that the window is being shattered, or is  
16 it right before the window is being shattered?

17 A. Before.

18 Q. Okay.

19 A. Yeah, before the window.

20 Q. That's one frame before the window shattered?

21 A. Two frames, or maybe three.

22 Q. Okay. Could I ask you to freeze on where the window is  
23 actually being shattered?

24 A. (Witness complies.) Okay.

25 Q. I have that actually on a blowup that I would like to

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1 show, if I could.

2 This is Exhibit -- what we've labeled 1-04. And it shows  
3 the window being shattered?

4 A. Uh-huh.

5 Q. And do you see where this crosshair is?

6 A. Yeah, that's correct.

7 Q. You see the crosshairs in the same place on your computer  
8 screen as well?

9 A. Uh-huh, yes.

10 Q. Okay. Now what I would like to do is, if I could, switch  
11 back to our system and show it up on the screen. While we're  
12 doing that, I have a question. Did you communicate with  
13 another expert in this case about what the appropriate frame  
14 was to use?

15 A. No.

16 Q. Have you had any communication with a government expert  
17 named Toby Terpstra?

18 A. No.

19 THE COURT: Becky, he needs water.

20 DEPUTY COURTROOM CLERK: Do you have water?

21 THE WITNESS: I do. I could use some more.

22 MR. CARY: I can give you some.

23 DEPUTY COURTROOM CLERK: No, we've got plenty.

24 THE WITNESS: Thank you.

25 ///

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1 BY MR. CARY: (Continuing)

2 Q. I would like to show you page -- a diagram from a report  
3 from the government expert named Toby Terpstra. I think it's  
4 Figure 5. Could I have that, please?

5 We're calling this Exhibit 1-23.

6 Does this appear to be the -- a split screen where on the  
7 left we have the Cox video with the shattered window and on the  
8 right we have the overhead? Do you see that?

9 I recognize this is not your report. This is Mr. -- I'm  
10 representing to you this is Mr. Terpstra's report.

11 A. That's correct.

12 Q. And it reads, does it not. "Figure 5. Retained expert  
13 Mr. Piazza's synchronized video with positions of parties and  
14 vehicles visible in FBI aircraft video."

15 Did I read that correctly?

16 Did I read -- I'm just asking if I read the words  
17 correctly.

18 A. No. Would you do that again, please?

19 Q. I'll read the caption here. "Figure 5. Retained expert  
20 Mr. Piazza's synchronized video with positions of parties and  
21 vehicles visible in FBI aircraft video."

22 THE COURT: That's not what it reads.

23 THE WITNESS: Oh, Judge, I see it. It's at the  
24 bottom.

25 MR. CARY: I'm sorry, Your Honor. I'm referring to

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1 the caption below the photo.

2 BY MR. CARY: (Continuing)

3 Q. In fact, maybe, to clarify, can you --

4 THE COURT: Oh, down below. Okay.

5 MR. CARY: Yes.

6 THE COURT: We were reading up above.

7 MR. CARY: I'm sorry to have confused you -- caused  
8 the confusion.

9 BY MR. CARY: (Continuing)

10 Q. Now we've highlighted that in yellow. Did I read that  
11 correctly? That's my only question for now.

12 "Retained expert Mr. Piazza's synchronized video with  
13 positions of parties and vehicles visible in FBI aircraft  
14 video."

15 Did I read that correctly?

16 A. Yes, you did.

17 Q. My question, sir, and I suspect what's causing you to look  
18 at it is can we agree that the crosshair in Mr. Terpstra's  
19 report is in a different place than the crosshair in your  
20 synchronized video?

21 A. That is a good observation you're making, but above that  
22 he says when round five is fired. We've just gone over the  
23 fact round four is where we're placing -- what I'm doing today.

24 So there -- we're kind of in between. So we have a couple  
25 of frames that we're dealing with, and I'm confused about round

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1 five versus round four, and I did not read this report, so --

2 Q. Let me ask you this: Were you asked to make a

3 determination as to when round five was fired?

4 A. No.

5 Q. Did you make any determination as to whether -- well, you

6 understand that there's evidence that there was a gunshot

7 defect in the Finicum truck; correct?

8 A. Say that again.

9 Q. You understand that there's evidence that there was a

10 gunshot defect in the Finicum truck?

11 A. What do you mean by "defect"?

12 Q. Let me try -- let me withdraw that and try again.

13 You testified this morning about seeing sparks flying and

14 glass shattering; correct?

15 A. Yes.

16 Q. You testified, I believe, this afternoon that you

17 associate that with one gunshot, not two?

18 A. I don't recall saying "one gunshot."

19 Q. Okay. Do you know whether that event is associated with

20 one gunshot or two or something else altogether?

21 A. I can't specifically say that it's one or two, but two

22 shots happened at that time.

23 Q. Was your job to decide when what's been called gunshot

24 number four took place or when gunshot number five took place

25 or something else altogether?

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1 A. The gunshots four and five, when we hear them, when they  
2 begin. My beginning point is reflecting gunshot four, and five  
3 follows.

4 Q. Okay. When you did your analysis, did you take into  
5 account the difference between the speed of light and the speed  
6 of sound?

7 A. Which analysis are we talking about?

8 Q. Your gunshot analysis. Your choosing the frame that you  
9 chose.

10 A. No, I did not do an analysis on the gunshots. You're  
11 saying I did an analysis.

12 Q. Let me try to rephrase. When you chose the frame  
13 associated with gunshot four, did you take into account the  
14 difference between the speed of light and the speed of sound?

15 A. No, I did not.

16 Q. I thought I heard you testify this morning that you  
17 believe the shooter was 20 feet away. Did I hear that  
18 correctly?

19 A. What I said was anywhere between 20 and 30 feet.

20 Q. Where did you get that information?

21 A. I'm -- I'm actually -- I discussed with Mr. Sussman,  
22 actually, yeah. We -- I asked, "How far away was the shooter?"

23 Q. And at what point was that in your analysis?

24 A. Wait. When you say "analysis," my --

25 Q. I'm sorry. I keep -- in your work -- at what point in

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1 your work did you have that discussion with Mr. Sussman when he  
2 told you the shooter was 20 to 30 feet away?

3 A. Last night.

4 Q. If we could go back to your report, please. If we could  
5 go back to page -- the second page. If we could blow up those  
6 numbers at the bottom. There's a whole lot of numbers on that  
7 page; correct?

8 A. Yes.

9 Q. And is that -- are those numbers what are called hash  
10 values that -- is that what those are?

11 A. No. Those numbers are not hash values.

12 Q. Oh. What are those numbers?

13 A. It's information that one sees in the header or the footer  
14 of a readout when you look at it in a hexadecimal editor. Also  
15 a file viewer software -- there are numerous -- will give you  
16 information about file type, length of the file, size of the  
17 file, codec of the file, information like that.

18 Q. Is it fair to say -- and my point is rather simple on  
19 this. Is it fair to say that those numbers represent  
20 identifying information about the files that you were provided?

21 A. Yes.

22 Q. And is it also fair to say that they don't represent work  
23 you did? They just identify the files that you got for  
24 identification purposes?

25 A. Yes.



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1 Q. And there are -- I think there are six different blocks of  
2 numbers like that in your report, and they all are basically  
3 the electronic version of labels; correct?

4 A. The electric -- say the electronic version of labels?

5 Q. The electronic version of a label?

6 A. I would say more the electronic version in digital form of  
7 identifiers that would enable you to identify the file by this  
8 information.

9 Q. And we can agree it doesn't identify the work you did. It  
10 simply identifies what the files are?

11 A. That's correct.

12 Q. Could we go to the second-to-the-last page of this  
13 exhibit, please.

14 If we could -- yeah, right there. So the -- the top  
15 refers to hardware and software; correct?

16 A. Yeah.

17 Q. That identifies the hardware and software you used. True?

18 A. Yes, that's correct.

19 Q. But it doesn't actually say what you did with it; right?

20 A. Well, I -- I address some of the services that I provided.  
21 Editing and enhancement and review.

22 Q. It doesn't describe in detail what you did. We can agree  
23 on that?

24 A. Yes, that's correct.

25 Q. It doesn't describe in sufficient detail for another

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1 expert to reproduce your work; correct?

2 A. There's no roadmap there.

3 Q. And then if we go down to the section that says "video  
4 analysis," I would like to focus on the second-to-the-last  
5 sentence that begins on the third line from the bottom on the  
6 right-hand side. "Video exhibits are enhanced. Color and  
7 light correction, sharpening."

8 MR. CARY: Can we highlight that, please, Ms. Oakley?

9 BY MR. CARY: (Continuing)

10 Q. Do you see where you write about color and light  
11 correction and sharpening?

12 A. Yes.

13 Q. I understand you testified that the synced video did not  
14 have enhancement done, but you did do enhancement on other  
15 videos; correct?

16 A. Yes, that's true.

17 Q. And that included color and light correction?

18 A. Yes, that's correct.

19 Q. And it included correction; right?

20 A. When you say "correction," what do you mean?

21 Q. I'm sorry. Let me rephrase. It included sharpening as  
22 well; correct?

23 A. Yes.

24 MR. CARY: And if we could have Exhibit 1-05 up,  
25 please.

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1 BY MR. CARY: (Continuing)

2 Q. What is Exhibit 1-05?

3 A. It is -- it is a frame that I took as a sample recently  
4 to -- it's for the judge, to show him what enhancement will do  
5 to -- this is the version -- this is an enhanced version you're  
6 seeing.

7 There's also an original version of this, as you know.  
8 And this is after -- after enhancement. It's explained below  
9 it's the overhead screenshot. This was just a random frame  
10 that I chose, and it shows it being -- what it looks like after  
11 enhancement.

12 Q. Okay. It's an example that you chose after you did your  
13 enhancement work to illustrate for the Court and for us what it  
14 is you did? Correct?

15 A. That's correct.

16 Q. And it shows, does it not, that sharpening was done?

17 A. Let's see it again.

18 Q. Yeah. We're going to give you a hard copy while the  
19 computer comes up. It reflects, does it not, that sharpening  
20 was done; correct?

21 A. Yes, it does.

22 Q. And you would -- this is an example of the sort of  
23 enhancement work that you did; correct?

24 A. Yes, this is generally an example.

25 Q. And you didn't keep any record of, in fact, what you did

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1 do; correct?

2 A. You mean with the other -- the earlier versions?

3 Q. Yes.

4 A. Yes, we -- yeah, we have been through that. I don't have  
5 notes for those.

6 Q. And it also -- and you would agree that sharpening  
7 modifies the pixel structure; correct?

8 A. Yeah. We need to define that a little bit. What do you  
9 mean by "modify," first?

10 Q. Change.

11 A. Change? Is "rearrange" change?

12 Q. Yes.

13 A. Okay. So the edges are mainly what's focused on when  
14 sharpening techniques are used. And if a person is sharpening  
15 an image and they are not careful to not overuse that  
16 technique, along with the other lighting decisions that are  
17 made with the other filters that go along with it, you can  
18 create distortion, and just along the edges where it's focusing  
19 on, create, let's, say, untrue shadows. And it's my job --  
20 it's another editor's job to make sure that that is not taking  
21 place so nothing is being masked or overexposed, for example.

22 Q. And would you agree that the correct way to do that, if  
23 you were doing it, especially in a forensic context, is to keep  
24 a record of what you were doing so that people can audit your  
25 work or check your work or reproduce your work later?

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1 A. Would I agree? I think that it's important when you can  
2 make a record that you should, yes.

3 Q. And then also in this exhibit, up in the upper right-hand  
4 corner, there's a graph with some colors; correct?

5 A. That's correct.

6 Q. What does that represent?

7 A. That's just the lighting that the -- the photo -- that  
8 is -- that is showing the kinds of light and tones that are  
9 present in that photo.

10 Q. And on the far left-hand side of that graph, there's a  
11 gray area in that little setting figure below it. Do you see  
12 that?

13 Maybe we can highlight that.

14 Do you see that portion?

15 A. Yes, I do.

16 Q. And is it -- do I understand correctly that everything  
17 that is shaded in gray shows pixels that have been lost in the  
18 color correction process?

19 A. I'm not aware of that with this, no.

20 Q. I would like to ask you about the syncing process that you  
21 undertook in this case.

22 You testified this morning about some anchors. Do you  
23 remember that testimony?

24 A. Yes, I do.

25 Q. And you specifically showed us two places where there was

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1 a pole of some sort; correct?

2 A. That's correct, yeah.

3 Q. And then another place where Mr. Finicum is getting out of  
4 the truck; correct?

5 A. Yes.

6 MR. CARY: Could I have Exhibit 1-14 up, please?

7 BY MR. CARY: (Continuing)

8 Q. And this shows your attempt to sync these videos using the  
9 pole; correct?

10 A. Yeah. The pole is there to illustrate that when in sync,  
11 wherever you find a sync place, that that pole would be visible  
12 at that frame.

13 Q. Is that one of the anchors you actually used to sync the  
14 video?

15 A. It's one of the confirming anchors. There were numerous  
16 anchors. This one, specifically more of the hand, is the one  
17 that was -- because I wanted to have an anchor that was present  
18 during the actual shooting of the gunshots.

19 Q. Okay. With respect to this one, did you use any  
20 photometric measurements to determine whether your syncing was  
21 done correctly?

22 A. No. Explain to me how that would work.

23 Q. Well, did you compare the possible matching frames using  
24 photometric measurements from the Cox video and the overhead  
25 video?

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1 A. I'm a little lost on how you use photometric measurements  
2 in order to take a visual that the naked eye can see and -- and  
3 be confident that you have found it by -- by viewing what you  
4 see, you know, on the screen.

5 Q. Let's talk about the naked eye. Could I ask you to play  
6 your synced video on a slow basis in the frames preceding this  
7 particular frame? Can you -- do you have the ability to do  
8 that?

9 A. Yeah.

10 You know, actually, no. I would have to prepare that. I  
11 don't have that particular version to play you. I would have  
12 to prepare that. Like, take some time to prepare it. Should I  
13 do that, or -- or do you have a version you want to show me?

14 MR. CARY: Let me -- do you think we can do that?

15 BY MR. CARY: (Continuing)

16 Q. Apparently not. Let me ask you this, then -- I won't ask  
17 you to do that.

18 Can we agree --

19 MR. CARY: If we can get that exhibit back up on the  
20 screen again.

21 BY MR. CARY: (Continuing)

22 Q. Can we agree that that pole that you've identified in this  
23 particular frame would have been visible in many -- in a number  
24 of frames before this particular shot from -- in the FBI  
25 overhead video?

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1 A. In the FBI video? Yeah.

2 Q. Yes.

3 A. Yes.

4 Q. So why did you choose this particular frame to sync your  
5 video?

6 A. Okay. Let me explain that. It's the other syncing that  
7 put this in sync, and then any opportunity I found after that  
8 confirmed my first syncing spot, which was what I mentioned  
9 before, which happened right at the time of the gunshot area,  
10 within seconds, right in that area.

11 Q. Did you use any -- we have established you didn't keep any  
12 work notes of this syncing process; correct?

13 A. That's correct.

14 Q. And did you use uncompressed image files to match the  
15 frames?

16 A. That's what we were given as originals.

17 Oh, I'm sorry. No, we did not have uncompressed versions.  
18 That's correct. We never got those from the beginning, so  
19 they'll never be uncompressed.

20 Q. And I heard your testimony this morning about how you  
21 thought the error rate was plus or minus three frames, but now  
22 you've determined it might be plus or minus ten frames. But my  
23 question is how did you calculate that you believe the error  
24 rate to be plus or minus three frames?

25 A. The frames are lined up differently in each video because



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1 they were not taken from the same exact source. So they both  
2 have their own beginning and ending point. They're accurate to  
3 the second. 30 frames a second.

4 It's possible the beginning of one frame didn't allow me  
5 to be exactly in sync, a hundredth of a second off, because of  
6 where its starting point was. But once the two frames from  
7 each video are selected as the starting point, from that point  
8 forward, everything remains synced.

9 Why did I say up to three frames? Because I believe that  
10 I could make a two-frame mistake locking them together because  
11 the visual cues might not be as -- it's possible to one eye  
12 that the visual cues might not be as strong as to your eye, for  
13 example.

14 I was confident that I was in that three-frame area  
15 because, as I continue to watch it and review it, the syncing  
16 seems to be in line. So I'm comfortable saying that I could  
17 make a two- to three-frame mistake -- it's not necessarily a  
18 mistake. It's a slight syncing error at that point.

19 So I needed to build that in. But I did know confidently  
20 once they were -- the sync spot was decided, that from that  
21 point on the video would stay in sync.

22 Q. Your error rate on this plus or minus three frames is  
23 nowhere in your report; correct?

24 A. No. No. But when I spoke with Mr. -- Mr. Koenig on the  
25 phone, I gave him that information.

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1 Q. When -- you eventually came to believe that the error rate  
2 is more appropriately expressed as plus or minus ten frames;  
3 correct?

4 A. Yes.

5 Q. When did you decide that?

6 A. A couple of weeks ago.

7 Q. What caused you to decide that?

8 A. Well, I knew we were -- we were going to have this date,  
9 and I wanted to go through the materials and make sure that  
10 they reflected everything that I said that they did, so I  
11 reviewed them.

12 Q. And in the course of your review, you found a syncing  
13 mistake?

14 A. I did. I did find a syncing mistake.

15 Q. You found it was off approximately ten frames?

16 A. That's correct, yeah.

17 Q. If there's a ten-frame mistake, how do you know that that  
18 is the maximum error rate if you found a ten-frame mistake?

19 A. That's where it falls, because before that we don't have  
20 any other errors that go beyond that. So we know -- I know and  
21 I'm comfortable saying that ten frames, maybe eleven frames,  
22 might be it. So I'm going to say ten frames.

23 MR. CARY: If we could look at Exhibit 1-17, please.

24 BY MR. CARY: (Continuing)

25 Q. So Exhibit -- what we're calling Exhibit 1-17, that's your

Piazza - X

1 Finicum sync; correct?

2 A. Can I make an adjustment here?

3 Q. Of course.

4 A. I'm getting reflection and light.

5 Q. Okay. Do you have it now, sir?

6 A. I do.

7 Q. And this is your syncing of Mr. Finicum getting out of the  
8 car and something you've observed in -- in the Cox video;  
9 correct?

10 A. Yes.

11 Q. And what is it you observe in the Cox video?

12 A. Mr. Finicum's hand and arm.

13 Q. And that's the anchor that you used to sync these two  
14 videos?

15 A. Yes.

16 Q. You testified this morning about a video that had a red  
17 circle around one of the operators; correct?

18 A. Yes.

19 Q. And was that an enhanced video?

20 A. Yeah. That video has enhanced qualities to it.

21 Q. And I noticed when I saw the video play this morning that  
22 there's the red circle around what apparently is a person, and  
23 then the camera goes away, and then it comes back and the red  
24 circle is on that person again -- or is on a person.

25 Do I remember that correctly?

Piazza - X/ReD

1 A. Yes.

2 Q. And how is it you were able to determine that it was the  
3 same person in the earlier video before the camera broke away  
4 and the later -- later footage?

5 A. That's a great question. I'm not able to determine if  
6 that was just an object moving around, and it didn't have  
7 clothes or backpack or something that was somewhat  
8 identifiable, then I would not be able to identify it; but  
9 after I produced it and I submitted it to the attorney and  
10 Mr. Cunningham, they were able to confirm that that was, in  
11 fact, the same person.

12 Q. Were you told that there were eight gunshots?

13 A. Was I told there were eight gunshots? I don't remember.

14 MR. CARY: Thank you. That's all I have.

15

16 REDIRECT EXAMINATION

17 BY MR. SUSSMAN:

18 Q. Mr. Piazza, Mr. Cary made reference to a syncing mistake  
19 of about ten frames. Was that a mistake in the syncing, or was  
20 that some sort of a glitch that occurred after the syncing?

21 A. It happened after the syncing. Some sort of anomaly  
22 occurred, and it -- it caused the Shawna Cox video to be a  
23 little delayed.

24 Q. And at what point in the synchronized video does that  
25 glitch or that jump occur?

Piazza - ReD

1 A. I actually have this written down.

2 It happens in the video at frame count number 1962, and  
3 the time reference is at 1 minute, 5 seconds. 12 frames.

4 Q. And that's in the synchronized video; correct?

5 A. Yes.

6 Q. Is that before or after shots four and five occur?

7 A. It's after. It's about roughly 20 seconds after all of  
8 the gunshots are done.

9 Q. And that's the first point at which you noticed a  
10 synchronization error?

11 A. Yes.

12 Q. You said that was, I'm sorry, how many seconds again?

13 A. Roughly 20 seconds after the final shots.

14 Q. Roughly -- so at roughly 20 seconds, times 30 frames per  
15 second, we're talking about what? 600 frames later?

16 A. That's correct.

17 Q. But at -- as of the time that shots four and five rang  
18 out, how was the synchronization then?

19 A. It's locked. It's fine.

20 Q. In other words, there is no synchronization error at that  
21 point?

22 A. That's correct.

23 Q. Now, Mr. Cary asked you whether there were any visual cues  
24 on the video for there being more than one shot. You said  
25 there were no visual cues for there being more than one shot.

Piazza - ReD

1 A. That's correct.

2 Q. And did you see, among any of the visual cues for either  
3 shot, something like a muzzle flash?

4 A. No, I did not.

5 Q. A puff of smoke out of the end of a barrel?

6 A. No, I did not.

7 Q. In fact, was the Shawna Cox video camera pointed at the  
8 position where the shots -- at the person who made -- who took  
9 the shots?

10 A. We don't even know that answer, but -- oh, no, no. It  
11 was -- no, it was not pointed. That's correct. It was the  
12 opposite direction.

13 Q. So the shooter, in other words, is not visible in the  
14 Shawna Cox video at all?

15 A. No. That's correct.

16 Q. Now, were there any audio cues in the Shawna Cox video  
17 that there was more than one gunshot taken there?

18 A. Yes.

19 Q. What was that audible cue?

20 A. There was a scream. There was a glass break. There were  
21 shrapnel or materials coming through the roof of the cab.

22 Q. Okay. Okay. But my question was what were the audible  
23 cues on the Shawna Cox video that led you to believe there was  
24 more than one gunshot at that point?

25 A. What were the audible cues? The sounds of the shots.

Piazza - ReD/ReX

1 They were clear to the ear.

2 Q. And you said that the two shots occurred approximately two  
3 tenths of a second apart.

4 A. Yes.

5 Q. Was that a precise measurement on your part?

6 A. Yes. It's a general measurement I made.

7 Again, that would fall more into an analysis category.

8 But I was able to determine that based on the narrowband  
9 spectrogram.

10 Q. And as you sit here today, despite the fact that there was  
11 a discrepancy found at a point in the video subsequent to the  
12 last of the shots being fired, is it your opinion to a  
13 reasonable degree of certainty that at the moment shots four  
14 and five were fired the synchronization was correct and  
15 accurate?

16 A. Yes, it was.

17 MR. SUSSMAN: That's all I have. Thank you.

18 THE COURT: Anything further?

19 MR. CARY: Yes, Your Honor, quickly.

20

21 RECROSS-EXAMINATION

22 BY MR. CARY:

23 Q. If we could, I would like to go back to your sync -- your  
24 synced video. Okay? Are you following me?

25 A. Yeah. Sure.

Piazza - ReX

1 Q. I would like to go look at this split screen of your sync,  
2 and I would like to go frame by frame.

3 A. You're playing it; right?

4 Q. No. Well, I would like for you to play it, please.

5 A. You want to use my video to illustrate?

6 Q. Yeah. Make sure we're all on the same page.

7 A. Okay. Okay.

8 Q. And I would like for you to go frame by frame. When you  
9 get close to when you believe the shots were fired --

10 A. Excuse me, Mr. Cary. I want to open it up and --

11 Q. Sure. Take your time.

12 A. I can go frame by frame or normal speed.

13 Q. I would like you to go frame by frame up until the point  
14 where you hear what you believe is shot four.

15 A. (Witness complies.)

16 I say it begins here.

17 Q. That's when you hear shot four? If you could stop on the  
18 frame where you hear shot four, please.

19 A. Okay. It's -- it's very audible in this frame.

20 Q. Okay. And then the window is not shattered yet;  
21 correctly -- correct?

22 A. That's correct.

23 Q. And then I would like for you to go to the shatter,  
24 please.

25 A. (Witness complies.)



Piazza - ReX

1 Q. Is that the shatter?

2 A. Yes, that's correct.

3 Q. Have you heard round five yet?

4 A. Now I am. After the shatter.

5 Q. So just so we're --

6 A. Seems to be within the area of where the glass shatters.

7 Q. So just so we're absolutely clear, we have shot -- what  
8 you believe is shot four goes first; correct?

9 A. Yes.

10 Q. And then you have the shatter; correct?

11 A. Yes.

12 Q. And then after the shatter you have what you believe is  
13 round five; correct?

14 A. Yeah. Or either simultaneously with it, with the crash.  
15 You know, you have a lot of things happening at that moment,  
16 sir. You have that first sound of shot four, and then it  
17 produces a tail of -- some sort of a reverb tail which then  
18 bleeds into the next shot, and the second shot has somewhat of  
19 a different sound to it. My ears hear it slightly differently,  
20 but I identified it earlier that it has the same  
21 characteristics and the same pressure and energy that I would  
22 expect a gunshot to have.

23 Q. So, sir, you don't associate the shatter with either shot  
24 four or shot five?

25 A. I hear two shots. I'm not telling you which one is going

Piazza - ReX

1 through the window because, you know, as I -- I don't see any  
2 visual cues for a second shot. I don't -- I only get a visual  
3 of one. A second one I don't get, unless it went through the  
4 same hole. But there are two -- two sounds of what I'm  
5 identifying as shots.

6 Q. Do the visuals, sir -- the visual cues that you get, do  
7 you associate them with one shot or the other?

8 A. It happens so fast. It's hard to really say which one.

9 Q. Could I get you to go back to the shatter, please, if I  
10 could? And, sir, do you see where those crosshairs are? Let's  
11 get to the shatter.

12 A. Yeah. So the shatter lasts for a few frames, right.

13 Q. You see where the crosshairs are? They're in the middle  
14 of those vehicles?

15 A. Yeah, I do. They begin here, and then they go up a little  
16 bit because, you know -- I'm not sure which frame you used in  
17 your illustration earlier, so I really can't be sure which  
18 shatter is, you know, absolutely the one you're talking about;  
19 but I see what you're saying, yes. The crosshairs are in --  
20 let's just say right in the center of those three cars while  
21 the shatter is taking place.

22 Q. Then I would like to go, if we could, if we can get the  
23 report for Mr. Terpstra up, Figure 5, again.

24 THE COURT: Before you do that, would you please play  
25 the shots that you heard without -- without. Just as shots,

Piazza - ReX

1 not clicks.

2 THE WITNESS: Okay. So you'll hear some of the audio  
3 that's --

4 THE COURT: That's fine. Okay.

5 THE WITNESS: Would you like that again?

6 THE COURT: That's fine.

7 THE WITNESS: Okay.

8 BY MR. CARY: (Continuing)

9 Q. Actually, before we leave this exhibit, I would like to go  
10 back and actually look at the -- the synced video that shows  
11 the sparks. If we could have you do that too, please.

12 A. The visual of the debris?

13 Q. Yes. Exactly.

14 A. (Witness complies.)

15 Q. So that's --

16 A. I wish -- if I made it -- I can make it larger. Hold on a  
17 second. Okay. So it's a little larger now. So the sparks,  
18 you can see it. It's visual -- it's visible. It's -- okay,  
19 let's be clear about the viewer that the camcorder records.  
20 It's cropped below the area where the bullet comes through the  
21 roof. So we don't really see the very beginning of that  
22 strike. We're only seeing the debris. And the first time we  
23 see the debris is right here.

24 Q. Okay. So freeze it right there with the debris.

25 A. Yeah.

Piazza - ReX/Further ReD

1 Q. Do you see that? I would like for you to note where the  
2 crosshairs are.

3 Do you see that?

4 A. Yeah.

5 Q. Now I would like you to go back to Figure 5 in the  
6 Terpstra Report, which is Exhibit 123, I believe. Do you see  
7 that? Do you see the sparks on the left?

8 A. Yeah, I do.

9 Q. Do you see on the right that the crosshairs are in a  
10 different location than they were in the video that we just  
11 looked at?

12 A. Yeah, I do.

13 MR. CARY: Thank you.

14 THE COURT: That's it?

15 MR. SUSSMAN: Your Honor, if I may, just a couple  
16 quick questions based on the questions that Mr. Cary just  
17 asked. If I may approach?

18

19 FURTHER REDIRECT EXAMINATION

20 BY MR. SUSSMAN:

21 Q. Mr. Piazza, do you see the operator standing in between  
22 the diagonal dark-colored pickup truck and the light-colored  
23 pickup truck that's near the centerline of the highway? Do you  
24 see which operator I'm talking about there?

25 A. Yes, I do.

Piazza - Further ReD

1 Q. Do you see that operator's position?

2 A. Yes.

3 Q. You're looking now at Mr. -- at Figure 5 from  
4 Mr. Terpstra's report; is that correct?

5 A. That's correct.

6 MR. SUSSMAN: If we can please display Mr. Piazza's  
7 synced video.

8 THE WITNESS: All you have to do is put it up. It's  
9 all cued up.

10 BY MR. SUSSMAN: (Continuing)

11 Q. Does that operator appear to you to be in the same place  
12 in the synced exhibit?

13 A. Yeah. Generally, looking at it now, yes.

14 Q. Does that operator remain in the same place for a good  
15 number of frames both before and after this particular frame?

16 A. Yes, he does.

17 MR. SUSSMAN: That's all I have. Thank you.

18 THE COURT: All right. You may step down.

19 THE WITNESS: Can I --

20 THE COURT: Your next witness.

21 MR. CARY: Your Honor, the defense calls  
22 Bruce Koenig.

23 THE COURT: Okay. Becky, will you swear the witness.

24 DEPUTY COURTROOM CLERK: Yes.

25

1 BRUCE KOENIG,  
2 called as a witness in behalf of the Defense, being first  
3 duly sworn, is examined and testified as follows:  
4

5 THE WITNESS: I do.

6 DEPUTY COURTROOM CLERK: Thank you. Please be  
7 seated.

8 THE COURT: Are you going to -- are you going to be  
9 using those?

10 MR. CARY: No, Your Honor.

11 DEPUTY COURTROOM CLERK: This is a book for you to  
12 look at. Could you speak directly into the microphone. State  
13 your name and spell your name for the record, please.

14 THE COURT: If any of you folks -- those seats are  
15 very hard. If you want to move into the jury box, you're more  
16 than welcome.

17 I never get a response.

18 MR. CARY: They're afraid they might get chosen for  
19 your next jury, Your Honor.

20 DEPUTY COURTROOM CLERK: Go ahead and state your name  
21 for the record.

22 THE WITNESS: Yes. It's Bruce E. Koenig.  
23 K-O-E-N-I-G.  
24  
25

Koenig - D

DIRECT EXAMINATION

BY MR. CARY:

Q. Mr. Koenig, what do you do for a living?

A. I'm a forensic scientist.

Q. Do you have your own forensic science firm?

A. I do.

Q. What's that called?

A. All capital letters BEK TEK LLC.

Q. How long has that business been in operation?

A. Since 1996.

Q. Before that, what did you do for a living?

A. Twenty-one years before that, I was a supervisory special agent for the FBI, working in the engineering group, specifically in -- most of my work was forensic. The remaining was operational things, like enhancing things like -- actually out in the field on an ongoing operation and running various tests on technical equipment.

Q. What was the last position you held at the FBI?

A. I was supervisor special agent, but I was in charge of the entire audio/video forensic group for the FBI. By far, even today, the largest group that does that. I had -- I think I probably have about the same nowadays. I had about 30 people on my staff. Three or four Ph.Ds, five or six supervisory special agents, all of which had physics and electrical engineer degrees. A staff of non-agent examiners, many of

Koenig - D

1 which had technical degrees, and then obviously people that --  
2 you know, somebody had to do the typing and package evidence  
3 and things like that.

4 Q. What degrees do you have, sir?

5 A. I have a bachelor's of science degree from the University  
6 of Maryland. I had double majors in physics and mathematics.  
7 I went to DeVry Institute of Technology, which is now DeVry  
8 University. I got a certificate in electronics. My master's  
9 degree is in forensic science from George Washington  
10 University. I've taken additional graduate courses in my field  
11 from Massachusetts Institute of Technology, University of Utah,  
12 University of Colorado Denver, and George Mason University.

13 Q. Have you authored peer-reviewed academic articles?

14 A. Yes. I believe I have 48. That also included a  
15 peer-reviewed book chapter.

16 Q. And have you testified in court as an expert?

17 A. Yes, sir.

18 Q. On approximately how many occasions?

19 A. Over 400.

20 Q. Have you conducted forensic examinations of gunshot  
21 events?

22 A. Numerous, yes.

23 Q. Can you give an approximation of how many?

24 A. Probably analyzed 4- or 5,000 gunshot sounds in various  
25 cases over the years.



Koenig - D

1 Q. Have you been involved in any high-profile gunshot  
2 investigations?

3 A. My associates and I are involved in a lot of those and  
4 along with people at the FBI. Like you said earlier, I worked  
5 on the Kennedy assassination, the attempted assassination of  
6 Ronald Reagan, the shootout between the Ku Klux Klan and  
7 various other groups in Greensboro. More recently, over 130  
8 shots were fired into a car up in Cleveland. A trial. We work  
9 on a lot of the ones you see on TV.

10 Q. Have you been retained in this case to provide scientific  
11 analysis?

12 A. Scientific analysis and probably more information on how  
13 things are actually done.

14 Q. And have you reviewed materials listed in your declaration  
15 dated April 3, 2018, and filed with the court?

16 A. Yeah, I -- certainly some of them might have only been  
17 pertinent portions of it, but yes.

18 Q. And you had a conversation with Mr. Piazza; correct?

19 A. Correct.

20 Q. And you listened to him testify here in court today;  
21 correct?

22 A. I did.

23 Q. And have you -- based on the review you've done and the  
24 work you've done, do you have an opinion as to whether it's  
25 necessary to conduct a scientific gunshot analysis in order to

Koenig - D

1 identify if and when gunshots were fired?

2 A. Yes, sir, I do.

3 Q. What is that opinion?

4 A. You need to do that.

5 Q. Why?

6 A. Well, I think part of it I have to kind of go back and  
7 kind of explain what's happening. The kind of work we do, you  
8 rarely would ever know -- in fact, you would never know the  
9 caliber of the shot ever. You wouldn't know specifically,  
10 without other information, who fired the shot. You usually  
11 can't tell the difference between weapons and pistols.

12 I just did a case a week and a half ago in which two  
13 military weapons were fired, same location. They were recorded  
14 very well, which means we pick up smaller defects than you  
15 would in a -- you know, the kind of recordings you have here.  
16 And they basically had a correlation level that were almost  
17 dead-on.

18 So it means that here -- we know it's two different  
19 weapons. You couldn't tell them apart, so we -- those kind of  
20 analyses are not really done in a sense of we can't really  
21 decide that.

22 So what you can get is you can decide things like the  
23 location of where a shot was fired. Not maybe who specifically  
24 did it and not a particular location. It's over there. I can  
25 say, well, these two gunshots came from basically the same

Koenig - D

1 case.

2 That's what happened in the example I just gave you. They  
3 were both fired from the same location. Even though different  
4 weapons, different ammunition, they were highly correlated  
5 because they fired at virtually the same location.

6 We also can see things, if it's in a certain area, on  
7 whether it's supersonic or not. You can look at it and see if  
8 the reverberation effect -- that's the echos off buildings and  
9 hills and whatever -- are consistent between the two, which  
10 might tell you, yeah, probably the same shooter.

11 So one person firing twice over in that direction in a  
12 short period of time, you would expect the sounds to look very  
13 consistent.

14 If they didn't, they probably would mean they weren't  
15 fired from the same location in both cases.

16 Q. Did you hear Mr. Piazza's testimony that he believes there  
17 were eight shots fired in this case?

18 A. Yes.

19 Q. And did you hear his reasoning for why he believes that to  
20 be so?

21 A. Yes.

22 Q. Do you agree that his methodology was correct?

23 A. I can't agree with that. I certainly do listen, but  
24 there's so much more information that can tell you that. For  
25 instance, if you have something that shows the effects of a

Koenig - D

1 supersonic shot, well, that would pretty well tell you that's a  
2 gunshot. That's information that very well could be there.

3 So, yeah, you're looking for other information. Like I  
4 said, a gunshot, you know, is kind of -- back it up -- that a  
5 gunshot has certain characteristics. It's a very, very loud  
6 sound. To give you an idea, there's a scale that's dBSPLA  
7 which stands for decibels or volume. Standard pressure level  
8 is just how -- it means that zero would be the threshold of  
9 hearing. "A" is a weighting function of how human beings hear.

10 Well, if you said zero you can't hear it, a jet engine, if  
11 you were right next to it, and you would be in pain, is 120.  
12 Okay? Gunshots normally are in the range of 140 to 160. In  
13 other words, if they lasted any length of time, everybody would  
14 be on the ground in agony and their ears would be bleeding. I  
15 mean, that's how loud it is.

16 So you have this very, very loud sound that is very, very  
17 short duration, which produces certain characteristics. To  
18 give you an idea the range of frequency -- and by "frequency,"  
19 I mean like a musical instrument. Low frequency is your low  
20 notes and higher notes -- we, as human beings, when we're 17 or  
21 18 years old, can hear out to about 20,000 hertz, as we call  
22 them, or cycles per second. And that's why they put these  
23 systems up around stores where they don't want teenagers. They  
24 put this loud 18,000 hertz tone up there that you and I cannot  
25 hear, but the teenagers can hear, so -- so to give you an idea,

Koenig - D

1 20,000 is close to the limits of human hearing.

2 Q. Okay.

3 A. Microphones can go out to about 160,000, so that's eight  
4 times that, and they still don't get the whole gunshot. So it  
5 tells you -- it's so short duration, and, you know, it's  
6 just -- media-wise means that real-world recording systems,  
7 even professional ones, can only record basically a portion of  
8 what sound actually is.

9 Q. What is an N-Wave?

10 A. An "N" is -- I think it's been put in the record as the  
11 letter "N." It's a supersonic wave. What happens is if I send  
12 any projectile toward you faster than the speed of sound, two  
13 things are going to happen. One is it is going to get to you  
14 before the blast. If I used a gun, you'd hear that. It gets  
15 there faster than the speed of sound. Okay? It basically puts  
16 up a, in the simplest terms, kind of a wavefront that do it.

17 So if you're around my age when jets flew overhead, and  
18 I'm sure the judge was around during that time, when you heard  
19 a sonic boom, that's an N-Wave. That's what's happening.

20 So if I fire at you in military munitions, AR-15s, and  
21 things like that, and, you know, M16As, and stuff like that,  
22 fired at three times the speed of sound. So if I fire  
23 something at you and you're recording it, you're going to see  
24 the N-Wave, which actually looks like kind of a distorted  
25 letter "N" -- that's where it comes from -- followed by the

Koenig - D

1 blast.

2 Q. Would it -- in your opinion, should there have been an  
3 analysis done of whether there were any N-Waves present in  
4 these facts?

5 A. Oh, yes. In other words, the only way you'll get a really  
6 accurate determination is to look at the beginning of the  
7 sound, usually in a waveform, that will tell you exactly when  
8 the thing starts. It will also show you the characteristics.

9 So, again, you can say, "Hey, here are the  
10 characteristics." Usually, you're looking at the first  
11 five-thousandths of a second or so. We call them five  
12 milliseconds. You're looking at that, and it's got something  
13 like my fingers. It's a waveform. Much like you might see in  
14 a hospital show with a heartbeat. Okay? You know, this is  
15 much louder and much closer together. But you see that  
16 waveform. It looks something like this. And then you have  
17 another one. If it's being fired pretty close at the same time  
18 by the same person in same location, shooting in the same  
19 general direction, although not perfect, they're going to be  
20 very consistent.

21 So you might very easily be able to look at this and say,  
22 yeah, these two shots seem to come from the same -- same place,  
23 same general ammunition and all.

24 Q. Based on your review of the facts in this case, can you  
25 tell whether N-Wave analysis was done?

Koenig - D

1 A. Specifically, when you asked the question, he said he did  
2 not do that.

3 MR. CARY: Can we look at Exhibit 2-3, please? It's  
4 actually Tab 3 in people's books as well.

5 BY MR. CARY: (Continuing)

6 Q. What is Exhibit 2-3?

7 A. It's what we would call a very low-resolution waveform.

8 Q. And what's the difference between a low-resolution  
9 waveform and a high-resolution waveform?

10 A. In our field, it would mean that we -- what we normally  
11 do, we blow it up. So you would -- if you took that and spread  
12 it over 50 feet or more, you would then start seeing the actual  
13 details; in other words, you would see the peaks and valleys  
14 and everything else.

15 Here you just see blobs of white. So you're not seeing  
16 the details, the very details you look at, to determine timing  
17 and other things in gunshot analysis.

18 Q. I may have asked you, but how would you describe this  
19 particular waveform?

20 A. Low resolution.

21 Q. And, in your opinion, was a low-resolution waveform -- if  
22 this is one provided by Mr. Piazza in this case, was this  
23 sufficient to do a proper analysis of how many shots were  
24 fired?

25 A. No.

Koenig - D

1 Q. Did you see the spectrograms that were displayed in court  
2 earlier with Mr. Piazza?

3 A. Yes, sir.

4 Q. What kind of spectrograms were those?

5 A. They were definitely narrowband spectrograms.

6 Q. What was the difference -- how would you compare a  
7 narrowband spectrogram to another type of spectrogram?

8 A. Let me explain what a spectrogram is.

9 Q. Sure.

10 A. Spectrogram has time on the horizontal axis. That is  
11 frequently -- again, low frequency to high frequency on the  
12 vertical. And then you're usually set up that if it's --  
13 especially on a grayscale -- most people use grayscales, not  
14 colored -- that the darker it is, that means the higher the  
15 amplitude or volume or energy, whatever you want to call it.  
16 So it really meets three things. You have time going across.  
17 It shows the frequency, and it shows how much energy or volume,  
18 or whatever you want to call it, is -- is in that particular  
19 place.

20 So what happens is is that it uses what's called a fast  
21 Fourier -- that's F-o-u-r-i-e-r -- transform. And basically it  
22 converts something from the time domain to the frequency  
23 domain.

24 Okay. Well, there's always a tradeoff. In other words,  
25 if you want to have really good time resolution, if you want to



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1 know exactly when something occurred, you don't have very good  
2 frequency resolution. So you might say, "Well, the frequency  
3 is, give or take, 2- or 300 hertz," where a narrowband would  
4 say, "Oh, yeah, it might only be 1 hertz," but your time will  
5 be like, "Oh, well, it occurred somewhere in this big window of  
6 time."

7 It can be many seconds of time, so, I mean -- or even  
8 more. Minutes even. Depends on how much resolution you want.

9 So a spectrogram is a useful thing, but you always have  
10 that time versus frequency. Well, if you are trying to time  
11 something, which I really don't recommend you use spectrograms  
12 for that at all anyhow, but if you did, you'd want wideband.  
13 You wouldn't care about the frequency. You want to know when  
14 it occurred.

15 Q. Is it possible to do a proper analysis of when -- how many  
16 shots were fired and when they were fired using narrowband  
17 spectrograms?

18 A. No. You'd have an inherent error that would be truly hard  
19 to define. But if you did, you would have to be provided with  
20 the information about fast Fourier transform, what's normally  
21 called an FFT, you'd have to know what its parameters were. I  
22 was never provided that for it.

23 So if you had that, you could probably compute, then, what  
24 window of time was involved for him to get that certain  
25 frequency.

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1 Q. Did you hear Mr. Piazza testify about visual cues?

2 A. Yes.

3 Q. Do you have an opinion about how he used visual cues in  
4 connection with audio data?

5 A. Well, I think most of it's forensically. It's not just in  
6 the audio/video field. When we do an analysis, our analysis,  
7 at a basic level, should be independent of any other data other  
8 than what we're analyzing.

9 So, therefore, yeah, if I see somebody's gun recoil or --  
10 a case I had last month, you could actually see the casings  
11 flying up out of the police officer's gun off a dashboard cam,  
12 a camera on the dashboard of the police car, or smoke, or, you  
13 know, a flame coming out the end, okay, geez, that's legit  
14 stuff. I don't need everybody else to tell me what it is. I  
15 can look at it. Okay?

16 You then do the actual acoustical work with those if you  
17 have those, and then if there's other information, well, you  
18 say, "Hey, here is my report. Here are my conclusions." I  
19 came up -- "Here is the timing," which you've got to almost  
20 always do in every case. "Here is the timing of the shots and  
21 here is everything else I can figure out doing that."

22 Then, if I'm provided additional information -- for  
23 instance, what if I come up and say there's 15 gunshots, and  
24 they tell me there was 13? Well, I tell them that they're  
25 incorrect. What usually happens is they -- they have to go

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1 look for other casings. Often they miss. Then they go back to  
2 the crime scene, often find the casings. It's a very accurate  
3 technique we do. So but we don't depend -- in other words, our  
4 report says, "Here is what we came up with." And then we can  
5 add to the end of the report. "Well, if I include this, I can  
6 then say this."

7 For instance, what if you told me there was -- I say  
8 there's ten shots, and they say, "Well, we found one gun fired  
9 seven shots and one gun fired three." Well, then I would give  
10 them a chart and say, "Okay. Here is the one that fired  
11 seven." You know, number one and two and number four, or  
12 whatever, and I would do that. But if that came back that that  
13 was incorrect, our report still stands. It's just their data  
14 was wrong.

15 Q. Do you have an opinion, based on what you've seen and read  
16 and heard, about the recordkeeping that Mr. Piazza used in this  
17 case, or lack thereof?

18 A. Well, I think I would agree with him. He actually said  
19 that, yeah, he -- you know, you should keep recordkeeping.  
20 First off, for your own self, you should be able to repeat  
21 exactly what you did and then, certainly, for somebody else to  
22 look at it. And often you need that data to figure out things  
23 like error rates.

24 Q. Did Mr. Piazza calculate, to your knowledge, an error rate  
25 for his gunshot analysis or for -- I'm sorry, for his counting

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1 of the number of shots?

2 A. No.

3 Q. Do you have an opinion about whether Mr. Piazza employed  
4 proper methodology in syncing the two videos that he testified  
5 about today?

6 A. It's really difficult to say. I -- I think based on the  
7 video it would be very difficult to be highly accurate in the  
8 syncing. And I'm not taking away from somebody else, but, you  
9 know, here I had one recording, the one that the FBI did and  
10 the one he did, and I think they both tried to do the best they  
11 could, and they were five frames off.

12 You know, so that's always a consideration, that two  
13 people do it that are supposed to know what they're doing, and  
14 it's off.

15 Second, the video itself, the quality is, you know, really  
16 awful. I mean, you know, if you took a single image like you  
17 put up here, it's hard to tell, without looking at a series of  
18 images, that, in fact, they're people. You know, they look  
19 kind of like shadowy kind of things. If you look at the video  
20 overall, you can tell there's people there, but each individual  
21 image does not. And that's what you're comparing in the  
22 syncing process, an individual image.

23 So it makes it difficult. One is inside the car. One is,  
24 you know, up in the air someplace, and the quality is very  
25 poor, especially on the aerial, not because I think the system

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1 is bad, but it's just the conditions that day and the movement.  
2 And, yeah, so it really makes it difficult to do it.

3 So, you know, I would say at best you should ever take the  
4 sync is it's somewhere in the ballpark. I don't know how wide  
5 the error rate is, obviously, because I haven't been given  
6 enough information for that; but, yeah, that's a concern.

7 Q. Did Mr. Piazza calculate an error rate?

8 A. No. I think he tried to make the best guess he could from  
9 his data. I think if he had written down -- if he had written  
10 down the individual frames, exactly what he did, and how -- and  
11 probably, like you said, he had 10 or 12 of these anchor --  
12 whatever he calls them. You know, I think if he had all of  
13 those exactly, what he used, and it was done independently, not  
14 looking now at the end result, but going to the independent --  
15 because it wouldn't be a perfect match. It would be -- always  
16 be off frames here and there. At least you would have some  
17 indication of error rate.

18 Q. Did he tell you about the anchors that he used?

19 A. No.

20 Q. And you heard him testify about two so-called anchors in  
21 court today; correct?

22 A. I asked specifically if he had listed the matching frames,  
23 and he said no.

24 Q. Is there additional analysis, other than looking at the  
25 two frames, that should be done as part of the syncing process;

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1 for example, photometric analysis?

2 A. If there's something there that you can do something that  
3 way -- and I haven't looked at it in any kind of detail to  
4 answer that -- yes, you would certainly want to do whatever  
5 kind of measurement you could do. Add some scientific validity  
6 to it. Otherwise, you know, it's not an expert. I mean, two  
7 people could look at them and say do they think the frames  
8 match. I don't think that's a scientific thing per se.

9 Q. Could you reproduce what he did from his report?

10 A. Oh, his report didn't actually have any details, really,  
11 much.

12 Q. And could you reproduce what he did from his notes?

13 A. He said he didn't have any work notes. At least I've  
14 never seen any.

15 Q. And could you reproduce what he did from what he testified  
16 to in court today?

17 A. I don't know. I -- I -- my guess is no. He doesn't know  
18 the exact anchors he looked at.

19 Q. Did you reach an opinion, sir, on whether Mr. Piazza used  
20 proper methodology in enhancing the videos?

21 A. Again, we're -- I guess I have two things I can say. One  
22 is we have no notes on his settings, so we have -- you know, we  
23 don't know exactly what he did. Second, there were some  
24 problems. I mean, in a couple of his enhancements, for  
25 instance, the snow is yellow. Well, we know snow is not

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1 usually yellow in big splotches. So I know that was not done  
2 correctly. The color is obviously off.

3 And, you know -- but, otherwise, there was sharpening  
4 done, but we don't know how much. In fact, this program he  
5 uses, it looks like -- we don't even know where it was. If you  
6 moved the, you know, slider they had, it wouldn't do it.

7 Most programs tell you in great detail when sharpening.  
8 Things like Photoshop, and all, that certainly accept video, it  
9 has, like, six or seven types, I think, of sharpening, and each  
10 one has got numerous parameters. Well, if you set one of those  
11 parameters incorrectly, you get artifacts.

12 Q. Let's look at 2-105, if we could. Exhibit 2-105, which I  
13 think is Tab 5 in your binder, which I just showed to  
14 Mr. Piazza.

15 Do you have that in front of you, sir?

16 A. I do.

17 Q. And this is what Mr. Piazza said is an example that he  
18 created after the fact of the type of enhancing you did.

19 A. That's correct.

20 Q. And can you explain what that -- what looks like a series  
21 of colors in the graph is up in the upper right-hand corner.

22 A. Is it possible I could do a little drawing?

23 Q. Would that be acceptable to Your Honor if he drew on a  
24 flip chart?

25 THE COURT: Sure. We need to take a break. How much

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1 more do you have?

2 MR. CARY: Five minutes, probably.

3 THE COURT: Let's take five minutes. Go ahead.

4 MR. CARY: Okay.

5 THE WITNESS: Can I step down?

6 The upper area -- just to make sure we understand who --

7 THE COURT: Please use a mic.

8 MR. CARY: It's coming.

9 THE WITNESS: Oh, can you hear me?

10 DEPUTY COURTROOM CLERK: Yes.

11 THE COURT: I can hear fine.

12 THE WITNESS: Okay.

13 DEPUTY COURTROOM CLERK: With these, I can hear the  
14 lawyers whisper.

15 THE WITNESS: Oh-oh.

16 MR. CARY: So we heard. There's a rumor.

17 Your Honor, just because I said five minutes, I'm a little  
18 worried that this may take a little more than that, and I don't  
19 want to --

20 THE COURT: Let me ask the reporter.

21 MR. CARY: It would be unfair to the reporter after I  
22 said five minutes.

23 THE COURT REPORTER: I'm fine.

24 THE COURT: She says okay.

25 MR. CARY: Okay.



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1           THE WITNESS: This area up here, Your Honor, is what  
2 we call a display of levels. It's a very common thing used in  
3 video enhancement and image enhancement. So it's not something  
4 rare. So, basically, to give you an example of -- so you can  
5 understand what's going on, across the bottom is the pixels  
6 that go from black on this end to pure white on this end, and I  
7 am talking about now on a black-and-white; but on a color, it  
8 would be each color.

9           THE COURT: I have it up here.

10          THE WITNESS: Each color would then go from lightest  
11 to darkest. Okay.

12          So if you had a document, you know, a typed document, a  
13 white paper, you would actually -- and this up here is how many  
14 pixels are involved. So on a black-and-white, there would be  
15 no grayscale. So you would end up with something that kind of  
16 looked like this. This would be flat, and this would come up  
17 like this.

18          So, in other words, on a black and white image, all the  
19 stuff is either going to be pretty well black or close to it,  
20 and everything else will be white, and there won't be any gray.

21          When you get into colors -- I have a couple of colors here  
22 I see. The colors will come up, and, you know, they'll look  
23 like -- like that for green, and then, you know, they have red  
24 and blue here. So this might be like this. Okay.

25          So then if you look at these arrows underneath up there,

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1 you'll see that it's -- one here and there's one, say, here.  
2 Over here.

3 So what these account for is this is where it's going to  
4 get cut off. In other words, if you put it to the ends and put  
5 this in the middle, it will be exactly the original. No  
6 change. If I put it there, it means all the pixels to the left  
7 don't exist anymore. They've all been made black. So any of  
8 these -- so that would mean that shadow detail would be gone.

9 And up here, if I go -- match it anyplace in here that the  
10 line is, it's going to be all white.

11 So on this particular one, this would mean that this part  
12 of the graph, starting here, over, which would be shadow  
13 detail -- so anything that's darker colored in the picture will  
14 now be made black. So, in other words, you would lose that  
15 data over here or the details in the shadow areas of the thing.

16 Forensically, on an overall picture, you would never do  
17 that because you're basically throwing data away.

18 There are times when you might use it for a particular  
19 thing in there that only has pixels in this range. You might  
20 do it. But if you're doing the overall picture, you would  
21 never -- you would never do that.

22 Q. Thank you, sir.

23 And, sir, as a -- as a matter of forensics -- better get  
24 back to a microphone -- would you ever throw away data without  
25 making a record of that?

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1 A. Yes. Absolutely. Normally, you would -- you would go to  
2 the end where there's no more pixels. It would make the  
3 picture look better, you know, certainly, and you only would do  
4 this if, like I said, like I told the judge, that all the  
5 pixels that you were interested in were somewhere in the middle  
6 someplace. But then you, first off, would absolutely put in  
7 the work notes. In fact, whatever you did here, you would make  
8 a screen capture or copy the data, so you'd have it; but if you  
9 sent it to your client, you would tell the client that you did  
10 it.

11 Q. Have you seen any indications at all how the data -- what  
12 data was thrown away, as you say, by this technique?

13 A. I don't know. He said this was an example of how he does  
14 his works, yes.

15 Q. And then if we can back out of that document, there's also  
16 an adjustment for sharpness.

17 Can you describe what that entails?

18 A. Well, again, since this program is not the higher-end  
19 program, you have one type of sharpness. So I can't tell you  
20 what's exactly the sharpening algorithm they're using because  
21 there's, you know, a number of them, and it's on a sliding  
22 scale, which means the only way to figure out exactly what it  
23 would do is to have that program, that exact, you know, version  
24 of that program, have a -- you know, the original and use that  
25 or use a test image and see exactly what it does to the image.

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1           Since we don't have that, there's no way to check that at  
2 all.

3 Q.     Can sharpening -- a sharpening function modify pixels?

4 A.     Oh, it absolutely modifies the amplitude, you know, how  
5 light or dark it is, for sure, on the edges.

6 Q.     Based on the testimony in this example, do you understand  
7 that Mr. Piazza modified or -- modified the sharpness?

8 A.     That was his testimony, yes.

9 Q.     And then modified pixels?

10 A.     Yes.

11 Q.     And was there any record, that you've seen, of how he did  
12 so?

13 A.     No.

14 Q.     If we could -- the final thing I want to talk about is if  
15 we can turn to your declaration. Exhibit 6A of your  
16 declaration.

17           MR. CARY: And maybe we can get it up on the screen.  
18 It's near the very end, I believe.

19           THE COURT: I have -- oh, there you go. That's fine.  
20 BY MR. CARY: (Continuing)

21 Q.     And, sir, is this -- is it your understanding this is one  
22 of the frames from the overhead video? Sorry.

23 A.     It's obviously turned, but yes.

24 Q.     That's fine. And then if we can go to the next page --  
25 two pages later, 6B.

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1 THE COURT: I have it, so you can start.

2 BY MR. CARY: (Continuing)

3 Q. What is -- maybe you can turn to it in your book. There  
4 it is. What is Exhibit 6B?

5 A. The first one wasn't right because it was also blown up.

6 Q. Oh, okay.

7 A. So that -- this looks like it may be -- is this 6A.

8 Q. This is actually 6B.

9 MR. CARY: Maybe -- maybe we've got -- maybe we  
10 should -- this is the last thing I have, Your Honor. Maybe we  
11 should take a break and make sure we present it crisply and  
12 then I'll be finished.

13 THE COURT: That will be fine. Let's try to make it  
14 in ten minutes.

15 MR. CARY: That's fine, Your Honor.

16 THE COURT: We're in recess.

17 (Recess taken.)

18 THE COURT: Please be seated.

19 Go ahead, Counsel.

20 BY MR. CARY: (Continuing)

21 Q. We now have what is Exhibit 6A from your original  
22 declaration up on the screen. And my question for you, sir, is  
23 what is that?

24 A. That's a frame from the aircraft -- you would have to look  
25 at the page before to know exactly which frame it is. It's

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1 from -- I guess it was one of the original -- I didn't put down  
2 which one here. Oh, here it is. It's used -- this was a video  
3 used for Figure 25 in the Terpstra report.

4 MR. CARY: If we can put Exhibit 6B from Mr. Koenig's  
5 original declaration on the screen, please. There we go.

6 BY MR. CARY: (Continuing)

7 Q. What is Exhibit 6B, sir?

8 A. This is a blowup of one area in which there was no added  
9 pixels. And to do that -- you know, if you have one pixel and  
10 you want to not make it different, you'd have to blow it up so  
11 you have four pixels. So you keep the same square. This one  
12 is nine, so it's three on the side. If you blow up anything in  
13 between, the algorithm is going to add whatever it thinks  
14 should be there. So it's adding pixels that never existed in  
15 the original image. This just basically takes one image and  
16 makes nine -- one pixel and makes nine of them exactly the  
17 same.

18 Q. What does this show us about the quality of the FBI  
19 overhead video?

20 A. This is the blowup of the area that I think everybody is  
21 interested in, and it shows you how low the quality is on  
22 there. I mean, it's really hard to -- like I said, if you just  
23 pick an image, without looking at any other images, it's  
24 difficult to even say are they people there or not people.

25 MR. CARY: Thank you. I have nothing further.

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1 At this time I would like to move in some exhibits. From  
2 the first notebook with Piazza, I move for the admission of  
3 1-02, which is behind Tab 2; 1-03; 1-04; 1-05; 1-14; 1-17. I  
4 also made reference to 1-23, but that's the Terpstra report  
5 that's already in evidence.

6 Now, with respect to Mr. Koenig, we've obviously made  
7 reference to his declaration, which is already in evidence,  
8 including what we just saw on the screen; but I would also move  
9 for the admission of T-3 -- I'm sorry. 2-3 and 2-5.

10 THE COURT: Thank you. They will be received.

11  
12 CROSS-EXAMINATION

13 BY MR. MALONEY:

14 Q. Good afternoon, Mr. Koenig. My name is Paul Maloney.  
15 Have we ever met before, sir?

16 A. I don't believe so.

17 Q. You may have remembered that you had a case with my  
18 partner here, Mr. Sussman, back in the mid '90s.

19 A. I have met many handsome guys. I would --

20 THE COURT: You think you would have the power to  
21 stop that kind of talk.

22 BY MR. MALONEY: (Continuing)

23 Q. Well, and the Navy had me out spinning circles off -- in  
24 the Indian Ocean while you guys were handling your case.

25 So here we are today. There's other people in this case

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1 that you know, is there not?

2 A. I certainly -- Frank Piazza and I have talked. We had  
3 lunch together, I think last June, in Arlington, Virginia. I  
4 think I met Luke Haag. I certainly have met his father,  
5 but it's --

6 Q. Do you mean Mike Haag?

7 A. I'm sorry. Mike. I apologize.

8 Q. Luke is the father.

9 A. I've met him a couple times.

10 Q. And do you know Professors Catalin Gregoras and  
11 Jeffrey Smith of University of Colorado Denver?

12 A. Catalin and Jeff are good friends of mine, yes.

13 Q. And do you consider them to be experts in the field, like  
14 yourself, in forensic media?

15 A. Yeah. They come at it from a different direction. They  
16 don't work the kind of, you know, numbers of cases we do. They  
17 mostly teach classes. They're very good at it. They're very  
18 bright people.

19 Q. When you were hired to conduct your analysis in this  
20 case -- it's important to familiarize yourself with the facts  
21 of the case; correct?

22 A. It depends on what I'm being asked to do, so I guess that  
23 would depend. Actually, what somebody is charged with isn't  
24 specifically important to me, for instance, yeah.

25 Q. As part of that, do you review the materials related to



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1 the case?

2 A. I review the materials I'm asked to review.

3 Q. And you list materials reviewed in your report. Are those  
4 the only materials that you reviewed in your work on this case?

5 A. I would say probably. I -- there was other ones I think  
6 we got recently, that I went through, that came in, you know.  
7 Yeah, very recent. Like last week. All I was asked was to  
8 look through them all. I didn't do any analysis, or anything,  
9 of them.

10 Q. But did you have access to the full discovery that was  
11 provided to the defendant and his lawyers in this case?

12 A. I don't know.

13 Q. Did you ask for it?

14 A. Nope.

15 Q. What was the scope of the work that you were retained to  
16 perform?

17 A. Mostly informative, to educate my clients on the various  
18 aspects that's been talked about today.

19 Q. And did you bring your full case file with you today?

20 A. I did not.

21 Q. Could you bring that in if requested?

22 A. Certainly.

23 Q. Now, Mr. Piazza, his -- his job was to do what? What was  
24 your understanding of what Mr. Piazza's role was?

25 A. I don't know that I want to repeat that. What he

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1 testified to was what he was asked to do, I presume.

2 Q. And are you familiar with the scientific method?

3 A. I have a number of science degrees, so, I guess, the  
4 answer would be yes. But I mostly -- I'm narrowly interested  
5 in the forensic science. That's what I do for a living.

6 Q. That involves a formulation of a hypothesis, testing that  
7 hypothesis, gathering data, drawing conclusions. Just like the  
8 same things we all learned in sixth grade science; right?

9 A. You wouldn't normally do that forensically. That's really  
10 more research direction.

11 Q. Okay. How does it work differently in a forensic context?

12 A. Well, usually you don't walk into something and it's a  
13 procedure nobody has done before. So basically it's a  
14 procedure that's already out there, and it -- you have certain  
15 information, you know, scientific basis, so you'd know the  
16 papers involved and all -- I mean, like in gunshot analysis,  
17 there's lots of papers. Lots of peer-reviewed papers, for  
18 instance.

19 Q. So you didn't approach this case with a true hypothesis or  
20 anything along the lines of this scientific method?

21 A. I tell people not to go that way forensically. It's a  
22 good way for a graduate student in, you know, a college to go  
23 that way because they're doing research.

24 You know, here if you make the wrong hypothesis, even if  
25 you come up with the right answer, the Court would say, you

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1 know, you, somebody like you, would be telling me, "Oh, you  
2 were wrong to start off with."

3 So I don't draw conclusions until I do the work. I look  
4 at the data. I analyze the data. And then, when I do that, I  
5 then draw a conclusion.

6 Q. Now, you would agree that science is an evolving thing?

7 A. I hope so, yes.

8 Q. We're always learning; right?

9 A. Yes.

10 Q. And, for example, Counsel pointed out in their pleadings  
11 in this matter that voice matching was one of those types of  
12 sciences that has -- our knowledge on that has evolved?

13 A. Voice matching wouldn't be a term. You're talking about  
14 voice recognition or voice identification?

15 Q. Yes, sir. The type of work you did while you were with  
16 the FBI.

17 A. Well, that was a small part of the work I did; but, yeah,  
18 the FBI wouldn't even testify to examination results because  
19 it's not a conclusive area.

20 Q. And you have in your CV that that was one of the areas  
21 that you provided the guidelines for voice identification and  
22 voice matching?

23 A. Again, "voice matching" nobody uses. Voice  
24 identification.

25 Q. Okay.

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1 A. The answer is, yes, there are people that do it. It's a  
2 technique that's -- my guidelines were in the spectrographic  
3 area. A lot of the work now is being done in different  
4 algorithms. Lots of different algorithms. So I wrote  
5 guidelines for people that needed to do that, even though we,  
6 at the FBI -- and I still believe it's -- you know, it's not a  
7 conclusive technique. It's a good investigative aid. We do it  
8 some privately; but, you know, we always tell clients up front  
9 the very limit -- all the limitations of the technique.

10 Q. And that's because that's no longer recognized -- or  
11 certain courts have not allowed that technology or those  
12 techniques to be admissible in this type of context like we're  
13 having today?

14 A. Certainly, that -- the courts are kind of all over the  
15 place, so I -- I'm not a lawyer that studies that, so I don't  
16 want to answer it. But the answer is, you know, all of these  
17 techniques are fraught with problems involving voice ID no  
18 matter which one it is. And various people testify to it, and  
19 I think as long as they can give an error rate, which is often  
20 the problem, it -- you know, it can be useful in court.

21 Q. Your -- before your life as a consultant and forensic  
22 scientist, you were an active FBI field agent?

23 A. That's correct.

24 Q. A field agent from 1970 to '74?

25 A. Yes.

Koenig - X

1 Q. And a supervisory special agent from '74 to 1995, by your  
2 CV; is that correct?

3 A. That's correct.

4 Q. Did you have to maintain firearms certifications that  
5 entire time?

6 A. Yes.

7 Q. Can you describe what that consists of?

8 A. Usually, it was three or four times a year for an entire  
9 day.

10 Q. Do you still shoot?

11 A. No.

12 Q. You listened to the audio files in this case?

13 A. I'm sorry?

14 Q. Did you listen to the audio files in this case?

15 A. Yes.

16 Q. Did you critically listen to the video recording,  
17 specifically the Cox video recording?

18 A. I wasn't there to analyze it. I mean, I listened to it a  
19 couple of times, but I wasn't there to analyze it.

20 Q. And my question, sir, was did you critically listen to the  
21 audio file in the Cox video?

22 A. No.

23 Q. Did you hear what sounds like, to the ordinary ear,  
24 gunfire?

25 A. Yes.

Koenig - X

1 Q. Did you watch the video from the inside of the cab of the  
2 truck -- the Cox video?

3 A. Yes. I listened to it and watched it at the same time.

4 Q. And did you observe those same visual cues that Mr. Piazza  
5 described?

6 A. Yes.

7 Q. Indicating gunfire?

8 A. Maybe.

9 Q. I mean, people were ducking; right?

10 A. I'm not saying it doesn't represent that. I'm just saying  
11 I don't -- I can't tell you it was. I did not do any analysis  
12 of that. You first have to decide when the gunshots occurred  
13 and other information, as I said before, before you even take  
14 the next steps and decide -- so if you did a thorough analysis  
15 of the gunshots and you know the exact timing of when they  
16 occur, then you can go through and match things like that and  
17 see if they're consistent with the gunshot.

18 Q. Did you look at the photos in this case?

19 A. Photos of what?

20 Q. Did you look at the photos of the truck in this case?

21 A. You mean, like, separate? Not video?

22 Q. Correct. The images, the forensic photographs that were  
23 taken by the criminalists.

24 A. I think it might have been in some of the material  
25 provided to me, but it really wasn't of interest because I was

Koenig - X

1 interested in the acoustical and video side.

2 Q. You stated in your second declaration that the time of the  
3 impact of the bullets would be different from the time that the  
4 gun was fired.

5 A. That's correct.

6 Q. And the audio that we hear and experience when a gun is  
7 fired, the physics of that is actually the audio -- the sound  
8 of that gunshot is actually the bullet leaving the barrel and  
9 the gases escaping; correct?

10 A. They're closely related. Actually, the blast is -- what  
11 you hear is mostly slightly ahead of the bullet at times. It's  
12 very close in time. I would agree with that.

13 Q. But it's not -- you're not hearing the powder hit the  
14 cartridge and ignite the charge that sends the bullet down the  
15 barrel. You're actually -- the noise is generated from the  
16 bullet leaving the barrel?

17 A. Well, I think you are asking what sounds like a simple  
18 question. It isn't. The research has shown that actually the  
19 noise is all along there. The loudest part seems to be, based  
20 on the research the Army -- U.S. Army has done, it seems to be  
21 more what you're saying. When it comes out, the blast comes  
22 out at the end of the barrel. That seems to be the main sound  
23 you hear.

24 Q. And how fast does a typical .223 round travel?

25 A. That would depend on the round. I mean, I can't answer

Koenig - X

1 that question as a general statement.

2 Q. Would it surprise you or be consistent with your training  
3 as an FBI agent that it's about -- that the rounds in this case  
4 were about 3,000 feet per second?

5 A. That's a common high-speed bullet speed, about three times  
6 the speed of sound, yes; but I can't tell you specifically just  
7 by saying it's a .223.

8 Q. Because there's a different amount of gunpowder and all  
9 kinds of different variables. Length of the barrel and all  
10 that kind of stuff; right?

11 A. That's correct.

12 Q. In fact, the published -- published speeds vary from  
13 2,700 feet per second all the way up to 3,200 feet per second.  
14 Would that be consistent with your experience, sir?

15 A. I'll take your word for it. I wouldn't know that.

16 Again, you're -- you have variables and, you know,  
17 different companies make different -- you know, somebody might  
18 make a .223 that isn't beyond the speed of sound. I have no  
19 idea.

20 Q. Let's assume that given the characteristics of the firearm  
21 at issue here, a shorter barreled rifle, with a moderately  
22 speeded bullet, traveling 2,700 feet per second, how fast -- or  
23 how long would it take that bullet to travel from the moment it  
24 leaves the barrel to impacting a target approximately 30 feet  
25 away?



Koenig - X

1 A. You want me -- I don't have a calculator sitting here, but  
2 obviously it's pretty straightforward math.

3 Q. Okay. Do you want to borrow one?

4 A. I mean, you're just dividing the distance by how fast the  
5 bullet goes. So it would be 30 over whatever the feet per  
6 second the bullet is traveling at.

7 Q. Okay. About a tenth of a second -- or a hundredth of  
8 second?

9 A. A little over a tenth.

10 Q. Or a hundredth of a second?

11 A. No. It would be a tenth of a second.

12 Am I doing the math wrong on top of my head here this  
13 afternoon? I'm sorry.

14 Q. It's a long day.

15 A. Okay. 30 over 2,700. It would be a little over a  
16 hundredth.

17 Q. I can't do math. That's why I went to law school.

18 So about a hundredth of a second?

19 A. A little over a hundredth of a second.

20 Q. Now, when you say that the time of the impact is different  
21 from the time of the -- that the gun was fired, in my  
22 hypothetical situation, if it's being recorded by a camera  
23 that's recording at 30 frames per second and you want to  
24 identify the exact time, does that one hundredth of a second  
25 really matter?

Koenig - X

1 A. Well, I guess it depends on what it does. If it's -- the  
2 video is mostly around about a sixtieth of a second. And then  
3 there's about a sixtieth of a second that doesn't have any  
4 video. So, therefore, yeah, if you're right on the edge of  
5 that, you can have one that, you know, you see it and the other  
6 one you don't.

7 Q. So it's a matter of milliseconds, as you testified earlier  
8 this afternoon?

9 A. Oh, all the waveform work is done -- you know, something  
10 like this, we -- we would blow up this legal-sized paper and  
11 have four or five milliseconds to look at at the beginning of  
12 each shot, and that would give us the detail we need to do, you  
13 know, some of the work we need to have done.

14 So yeah. So a piece of paper that big is going to have  
15 five-thousandths of a second to be able to see what we want to  
16 be able to look at.

17 Q. And in this video, the one that we played throughout the  
18 day today, how many seconds does the man standing closest to  
19 the truck stand in that position?

20 A. I have no idea.

21 Q. You're familiar with the sound of gunfire?

22 A. Yes. I said I was in the Army and the FBI, so obviously I  
23 did a lot of shooting.

24 Q. How long were you in the Army?

25 A. Two years.

Koenig - X

1 Q. And you went from the Army to the FBI Academy and then  
2 straight in as an agent?

3 A. That's correct.

4 Q. In your time either in the military or in the Army -- or,  
5 I'm sorry, in the military or in the FBI, did you ever run  
6 across the phrase "double tap"?

7 A. I've heard it, but it's not something that I'm familiar  
8 with.

9 Q. What is a double tap?

10 A. I would not want to define it.

11 Q. Is it fair to describe it or have you heard it used in  
12 this context: That it's two shots fired in rapid succession?

13 A. I don't want to say that. That's not usually the term  
14 I've heard for that, but it's -- you know, usually it's how you  
15 describe it. But people that just shoot guns all the time and  
16 that's their profession have their own phraseology, just like  
17 we have in ours, yeah.

18 Q. Does the -- do shots four and five sound like two shots  
19 fired in rapid succession?

20 A. Well, I would say I think they were four tenths of a  
21 second apart, not two tenths, as was said earlier, if I  
22 remember right. There are two shots. They are gunshots that  
23 were fired close together, but that does not mean they were  
24 fired from the same weapon and the same location.

25 Q. You talked about your gunfire analysis that you would do

Koenig - X

1 involving all your waveforms and your narrow and wide  
2 spectrograph analysis. Given what you know about the  
3 recordings in this case, would you be able to do those types of  
4 analyses?

5 A. Certainly.

6 Q. Did you do them in this case?

7 A. Nope.

8 Q. Would you be able to attribute -- do you think you would  
9 be able to attribute directional information from the quality  
10 of the recording in this case?

11 A. No one ever gets that kind of information unless you have  
12 a stereo recording.

13 Q. Do you think you would be able to get range information?  
14 How far away the gun was from the recording in this case?

15 A. If there's an N-Wave involved, possibly, or an echo that  
16 would tell me. I would think a -- well, they probably wouldn't  
17 get an echo that would tell me that. So you might have an  
18 N-Wave. You know how fast the ammunition is and how fast it's  
19 firing, like, you know, you said. You can look at the  
20 difference between, because the N-Wave gets there ahead of the  
21 sound, and you use that differential if you know the speed of  
22 the bullet.

23 Q. Would you agree that all Mr. Piazza did was identify the  
24 points in time when there appeared to be loud noises that  
25 sounded like gunfire?

Koenig - X

1 A. I believe he thought there were eight loud sounds. And I  
2 might have been told ahead of time that other evidence told him  
3 that. And he came up with the eight sounds that were the  
4 loudest. So I kind of agree with what you're saying, yeah.

5 Q. But you have no information to the contrary, that those  
6 are not gunfire?

7 A. Well, I mean, I think the number three doesn't -- you  
8 know, just listening doesn't -- I mean, again, I didn't  
9 critically listen to it, but the third one doesn't really sound  
10 much like the others. So that may not be a gunshot; but,  
11 again, I have no opinion because I haven't done the work.

12 Q. Now, you also opined about the video analysis, the  
13 synchronization that was done in this case. Through that  
14 process, is it better to review those images on a printed page  
15 or on a computer screen?

16 A. The way it's normally done is, first off, you wouldn't  
17 convert the file, so you would have a problem with that. You  
18 would pull off the individual images in an uncompressed format.  
19 We usually use Bitmaps; but there's, you know, other ones out  
20 there. And then we -- then we can look at the individual  
21 images on the screen. We use mostly super high-resolution  
22 monitors, so we can easily put a number of large monitors so we  
23 can put them on there and look at them very carefully.

24 Q. But an image from a video, would that be something that  
25 you would lose quality by printing it out?

Koenig - X

1 A. Yes.

2 Q. For example, do you know the quality at which your 6A and  
3 6B exhibits were printed out?

4 A. I didn't print them out. I -- when I put it together --  
5 that was one of my declarations, if I'm correct -- I would have  
6 submitted it as -- as a bitmap image, the two of them, into a  
7 .jpg -- into a .pdf, but I certainly had the original images.

8 Q. If the frames are running at 30 frames per second and the  
9 time counter is -- and you're given that time counter, as  
10 Mr. Piazza had from this morning, would you be able to convert  
11 the time counter information to a frame?

12 A. What do you mean by the time? You're talking about  
13 on-screen time?

14 Q. When he had his video playing this morning --

15 A. Okay.

16 Q. -- and this afternoon, he was able to say how many  
17 minutes, how many second, and how many frames.

18 A. Well, all the programs read it that way, so that's normal.

19 Q. Okay. And did he give you that information?

20 A. No. I specifically asked for it. He said he did not.  
21 You're talking about the syncing?

22 Q. Correct. Did he give you the time counter information,  
23 like he testified?

24 A. No. The only thing he gave me is the times of the gunshot  
25 sounds -- the beginning of them.

Koenig - X

1 I specifically asked for that, and I -- I actually typed  
2 all this out as he was doing it, and I read almost everything  
3 back I typed to make sure there was no misunderstanding.

4 Q. Did you look at those video frames that corresponded to  
5 the time markers Mr. Piazza gave you?

6 A. He didn't give me -- the time markers were only for the  
7 gunshots. He told me out to, I think, a millisecond where the  
8 gunshots he thought started. That's all the numbers he gave  
9 me.

10 Q. Did you look at those frames?

11 A. I went through generally and looked at those frames, but  
12 nothing in any detail.

13 Q. You didn't conduct your own comparison of those frames?

14 A. I shouldn't say "frames." He gave me times, not frames.

15 Q. The frames that correspond to the times that Mr. Piazza  
16 gave you?

17 A. Well, he gave me the times and the audio track.

18 Q. Did you --

19 A. There often is a disconnect between the video information  
20 and the audio for a number of reasons.

21 Q. So the answer to my question is, no, you didn't look at  
22 those times?

23 A. No. The times -- I listened to it, heard the sounds.  
24 What he gave me was the times for the audio track. He didn't  
25 gave me frame times. He gave me audio times from the audio

Koenig - X

1 track.

2 Q. Did you mention that in your declaration?

3 A. I don't remember specifically, but I definitely have it in  
4 my notes which were made at the time I talked to him.

5 Q. Why didn't you put that information in your declaration?

6 A. No, he specifically said he could not tell me the matching  
7 frames in the sync, which I think is in my declaration.

8 Q. Did you state in your declaration that he provided you the  
9 audio track information like you've testified today?

10 A. Well, audio track in the sense of the gunshots, not the  
11 synchronization. It had nothing to do with synchronization.  
12 He provided me the times at the beginning of the file for when  
13 the eight events he thought were gunshots occurred. That's  
14 from the audio track, not the video.

15 Q. Did he offer to provide you with the frame information you  
16 were seeking?

17 A. Well, I didn't ask him for the frames matching the  
18 gunshots.

19 Are we talking about the gunshots or the synchronization?

20 Q. You were looking for the frames for the synchronization;  
21 correct?

22 A. I asked for that specifically, and he said he had not  
23 written down the matching frames. He also said he had not  
24 pulled them off individually as some kind of uncompressed image  
25 file.



Koenig - X

1 Q. Did he offer to provide that information to you?

2 A. He said he didn't have it specifically. And, to be  
3 honest, I have yet to receive it.

4 Q. Did you attempt to determine an error rate for the sync --  
5 either Mr. Piazza's sync or the FBI's synchronized videos?

6 A. You can't do it. You have to do the error rate based on  
7 the matching frames. Since I've never had that information, I  
8 can't do it.

9 Q. Would you agree that plus or minus ten frames is fair for  
10 this synchronization.

11 A. It seems pretty wide to me, but I don't know.

12 Q. You did compare Mr. Piazza's sync to the FBI sync;  
13 correct?

14 A. Yeah, I took a look at certain frames that I could match  
15 up for sure -- of course, it was the same information, so that  
16 was easy -- and determined there was a five-frame differential.

17 Q. And if the error rate you found was five frames, that  
18 would still be within the plus or minus ten frames that  
19 Mr. Piazza testified to today; correct?

20 A. Well, I didn't -- I just said -- I just -- I wasn't  
21 looking at an error rate. I just said they're five frames  
22 apart. They could both be wrong. One could be right and one  
23 would be wrong, but they both could be wrong. I didn't analyze  
24 it for correctness or error rate. I just said there's a  
25 five-frame differential.

Koenig - X

1 Q. According to your declaration, you said you were unable to  
2 evaluate the methodology or the accuracy of Mr. Piazza's  
3 synchronization?

4 A. That's correct.

5 Q. Are you -- and you said that you're familiar with  
6 Professors Smith and Gregoras?

7 A. Certainly.

8 Q. You consider them to be forensic media experts?

9 A. Yeah. As I said, they come from a different direction, to  
10 a large extent, so I can't tell you. I mean, if they're doing  
11 synchronization, I mean, they're scientists. They're going to  
12 think like scientists.

13 Q. And that they were provided the same materials that were  
14 provided to the defense?

15 A. What you're talking about, I have no information on it at  
16 all.

17 Q. And that they were able to conduct --

18 THE COURT: Now, wait a minute. We're not going to  
19 get into something that isn't here. No comparison.

20 Move on to a different subject.

21 BY MR. MALONEY: (Continuing)

22 Q. So without having conducted your own independent tests,  
23 within the field of forensic and video analysis, can you  
24 conclude to a reasonable degree of scientific certainty that  
25 the audible events identified as gunfire did not occur within

Koenig - X

1 plus or minus ten frames of Mr. Piazza's sync?

2 A. Since I have no information in the sense of an analysis, I  
3 can't really answer the question.

4 Q. You testified about N-Wave analysis.

5 A. Yes, sir.

6 Q. Do you have the ability to analyze the -- the technology  
7 needed to conduct an N-Wave analysis?

8 A. Yes, sir.

9 Q. Could you have done that in this case?

10 A. If asked, certainly.

11 MR. MALONEY: Thank you, sir. Those are all my  
12 questions.

13 THE WITNESS: Thank you.

14 THE COURT: Anything further?

15 MR. CARY: Nothing further, Your Honor.

16 THE COURT: You may step down.

17 THE WITNESS: Thank you, Your Honor.

18 THE COURT: Do you have another witness?

19 MR. SUSSMAN: We do, Your Honor. The government  
20 calls Victoria Dickerson, please.

21 DEPUTY COURTROOM CLERK: Raise your right hand.

22

23 VICTORIA DICKERSON,

24 called as a witness in behalf of the Plaintiff, being first  
25 duly sworn, is examined and testified as follows:

Dickerson - D

1 THE WITNESS: I do.

2 DEPUTY COURTROOM CLERK: Okay. Have a seat. Speak  
3 directly into the mic. And if you could spell your first and  
4 last name for the record, please.

5 THE WITNESS: Victoria Dickerson. D-i-c-k-e-r-s-o-n.  
6

7 DIRECT EXAMINATION

8 BY MR. SUSSMAN:

9 Q. Ms. Dickerson, how are you employed?

10 A. I'm employed as a forensic scientist by the Oregon State  
11 Police.

12 Q. How long have you been a forensic scientist for the Oregon  
13 State Police?

14 A. Almost 13 and a half years.

15 Q. What do your duties include as a forensic scientist?

16 A. I work in a variety of forensic disciplines, so the crime  
17 scene discipline, latent print processing discipline, and  
18 biology processing discipline. And in addition to that I also  
19 work in our quality assurance discipline. That's a program  
20 that monitors the quality assurance of our crime scene  
21 discipline, and I'm the technical leader for the entire  
22 division.

23 Q. And do you have any college education?

24 A. I do. I have a bachelor of science degree in forensic  
25 science from the University of North Dakota with minors in

Dickerson - D

1 mathematics, chemistry, and criminal justice.

2 Q. And when did you graduate?

3 A. In December of 2004.

4 Q. When did you start working for the state police forensic  
5 laboratory?

6 A. In January of 2005.

7 Q. And you've been there ever since?

8 A. I have.

9 Q. Do your duties as a forensic scientist include examining  
10 bullet impact sites?

11 A. They do.

12 Q. And estimating bullet trajectories?

13 A. Yes.

14 Q. And have you received specialized training in connection  
15 with your work at the Oregon State Police Forensic Laboratory?

16 A. Yes.

17 Q. Including the areas of bullet impact site determination?

18 A. Yes.

19 Q. And trajectory analysis?

20 A. Yes.

21 Q. And point of origin determination from trajectory  
22 determinations?

23 A. Yes.

24 Q. Approximately how many bullet impact site investigations  
25 have you conducted?

Dickerson - D

1 A. I don't have those exact numbers. I've responded to well  
2 over a hundred crime scenes. That's probably a very  
3 conservative estimate. And many of the crime scenes that we  
4 respond to involve gunfire or firearms, so a large portion of  
5 those; but I don't, again, have the exact numbers.

6 Q. Have you prepared a curriculum vitae?

7 A. I have.

8 Q. Do you see the exhibit notebook on the stand in front of  
9 you there?

10 A. Yes.

11 Q. Could you turn to the tab that has your name on it,  
12 please?

13 THE COURT: I've reviewed her CV. She's well  
14 qualified.

15 MR. SUSSMAN: I'll just have her adopt it, then,  
16 Your Honor.

17 THE COURT: Yes. Thank you.

18 BY MR. SUSSMAN: (Continuing)

19 Q. Do you have that in front of you now?

20 A. I do.

21 Q. Is that your most current curriculum vitae?

22 A. This was one that I prepared in November. Since that  
23 time, I voluntarily no longer do casework in the latent print  
24 comparison discipline, so that needs to be struck from the --  
25 from the record for today. But at this time, it was accurate.

Dickerson - D

1 Q. Okay. Do you adopt the contents of that for the purpose  
2 of this hearing?

3 A. Yes.

4 Q. And could you take a look at the next tab, please, labeled  
5 "Reports"? Behind the coversheet labeled "Exhibit 1", do you  
6 recognize that document?

7 A. Yes.

8 Q. What is that document?

9 A. It's an analytical report that I prepared dated March 28,  
10 2016.

11 Q. And I notice it's signed by an officer whose initials are  
12 listed as AA.

13 A. Correct.

14 Q. Is that you?

15 A. That's me.

16 Q. Your initials are not AA.

17 A. They're not.

18 Q. Was that just a code that was used earlier in the case to  
19 identify you?

20 A. Right.

21 Q. But that is your forensic report in this case?

22 A. It is.

23 Q. And do you adopt the contents of that as your -- part of  
24 your direct examination today?

25 A. Yes.

Dickerson - D

1 Q. And does your curriculum vitae list professional  
2 organizations that you're a member of?

3 A. It does.

4 Q. Including the positions you've held as an officer in those  
5 organizations?

6 A. Yes.

7 Q. And as well as how many times you've testified as an  
8 expert witness before?

9 A. Yes.

10 Q. And that's all been in state court?

11 A. Yes.

12 THE COURT: She's well qualified. Let's get on to  
13 her report.

14 BY MR. SUSSMAN: (Continuing)

15 Q. Were you called to the scene of an officer-involved  
16 shooting outside of Burns, Oregon, on January 26 of 2016?

17 A. I was.

18 Q. And did you respond to the scene?

19 A. I did.

20 Q. Did anyone else from the Oregon State Police Forensic  
21 Laboratory go with you to the scene?

22 A. Yes. Lab director Brian Medlock responded with me.

23 Q. And about what time did you get out to the scene?

24 A. We stopped at a Jeep Wrangler on the way to the  
25 primary scene that's at question today, and we got to that Jeep



Dickerson - D

1 Wrangler at about 1:12 in the morning.

2 Q. That would actually be on January 27th of 2016?

3 A. Correct.

4 Q. How long did you spend at the Jeep Wrangler?

5 A. Just a short amount of time, and then we proceeded to the  
6 shooting scene in question, arriving at approximately 1:33 a.m.

7 Q. And did you do anything at the scene, the first scene you  
8 stopped at with the Jeep Wrangler?

9 A. Just preliminary photos, but we didn't actually examine  
10 that Jeep.

11 Q. All right. So what did you see when you got to the second  
12 scene at about 1:33 in the morning?

13 A. The second scene had a variety of evidence that we  
14 documented. Predominantly, there was a deceased male laying in  
15 a snowbank. There were two pickup trucks and then a variety of  
16 other firearms and less lethal-related ammunition in the  
17 roadway and around that shooting scene area.

18 Q. And the deceased man was Robert LaVoy Finicum?

19 A. Correct.

20 Q. Did you see a white four-door Dodge Ram pickup truck in  
21 the snowbank on the west side of the highway?

22 A. Yes.

23 Q. Can you describe how the truck was situated when you first  
24 got there?

25 A. The truck was deeply embedded in the snow, and it was

Dickerson - D

1 angled down towards the highway with the driver's side higher  
2 than the passenger's side.

3 Q. When you say "deeply embedded in the snow," was it setting  
4 on top of the snowbank?

5 A. It was sitting in the snowbank. So there was snow,  
6 especially on the passenger's side, that was up against the  
7 doors. There was snow in the wheel wells. It was very deeply  
8 embedded within that snowbank.

9 Q. Did it go into the snowbank nose first?

10 A. Yes. It appeared to.

11 Q. Now, you said it was tilted at an angle passenger's side  
12 down and driver's side up?

13 A. Correct.

14 Q. You got there about 1:33 in the morning; is that right?

15 A. That's correct.

16 Q. It was dark out?

17 A. It was.

18 Q. Was there any supplemental lighting in the area?

19 A. There was. Law enforcement at the time had gotten a  
20 construction light, similar to the kind you would see when you  
21 drove by a construction sign -- or a construction site at  
22 night, so there was big overhead lights. There were lights.

23 THE COURT: Was the engine running?

24 THE WITNESS: In -- the truck in the snowbank? I  
25 don't believe so.

Dickerson - D

1 THE COURT: Okay.

2 BY MR. SUSSMAN: (Continuing)

3 Q. Now, at some point did you actually measure the angle at  
4 which the truck was sitting in the snowbank?

5 A. I did.

6 Q. How did you do that?

7 A. We did it with a digital inclinometer.

8 Q. And how many different measurements of the truck did you  
9 take?

10 A. We took measurements from four different areas.

11 Q. Which areas?

12 A. From the tailgate, the approximate center of the truck cab  
13 or canopy, the approximate center of the roof of the vehicle,  
14 and then the front bumper.

15 Q. And did that produce four separate angle measurements?

16 A. It did.

17 Q. What were those measurements?

18 A. I need to refer to my notes for that part.

19 The tailgate was approximately 14.8 degrees, the canopy  
20 13.8 degrees, the front bumper 14.3 degrees, and the center of  
21 the roof 14.9 degrees.

22 Q. So somewhere generally between 14 and 15 degrees?

23 A. Yes.

24 Q. And at what time did you take those measurements?

25 A. I don't have that in my notes; but according to the camera

Dickerson - D

1 data, it was around 5:00 in the morning.

2 Q. By that point the truck had been sitting in that snowbank  
3 for some time?

4 A. Yes.

5 Q. Could you tell whether the truck had settled at all  
6 between the time it came to rest in the snowbank and the time  
7 you measured the angle at which it was sitting?

8 A. Not -- not in any scientific way. Logic tells me that  
9 when a hot truck enters a cold snowbank that there is going to  
10 be some melting and settling, but there wasn't any specific  
11 measurement that we took to figure out how much that settling  
12 was or could have taken, that I'm aware of.

13 Q. And did you see any evidence, though, that the truck had,  
14 in fact, settled?

15 A. It was deeply embedded in the snowbank, as I said, with  
16 snow up against especially that passenger's side. There  
17 weren't any obvious visual gaps in the snow on that side of the  
18 snowbank, and it was so deeply embedded that there's no way to  
19 tell visually how far down it sunk. There was no visual way I  
20 could have seen that.

21 Q. Did you have any way of measuring or determining how much  
22 the truck had settled side to side?

23 A. No.

24 Q. Or front -- or if it settled front to back?

25 A. Again, just those visual indicators of the heavy snow all

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1 the way around it.

2 Q. Did you see any indication that the truck had shifted from  
3 side to side at all after it came to rest in the snowbank?

4 A. No visual indicators.

5 Q. Did you find any evidence that the truck had somehow  
6 rotated on its axis or yawed after it became embedded in the  
7 snowbank?

8 A. Visually, no.

9 Q. You said that there were no obvious visible visual gaps  
10 that the truck had rotated or yawed?

11 A. Nothing that I saw.

12 Q. You said that the truck was deeply embedded in the  
13 snowbank. Were you present when the truck was pulled out of  
14 the snowbank by a tow truck?

15 A. I was.

16 Q. Anything unusual happen during that process?

17 A. It was -- it was a process. That's a good way to describe  
18 it. It took a long time. The first tow truck that came  
19 actually broke during the process. I don't know exactly what  
20 broke, but I think it was the strap that connects to the truck  
21 to pull it out. So then they actually got another tow truck  
22 and did sort of a chain of tow trucks to pull it out, and one  
23 of them was actually suspended in the air at that point. So it  
24 was -- it was definitely an interesting tow experience. The  
25 most interesting one I've ever seen.

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1 Q. What happened once the truck was finally extricated from  
2 the snowbank?

3 A. So then we did a cursory examination of the truck. We  
4 removed items that were of obvious evidentiary value, mostly  
5 electronics and firearms.

6 Q. And then?

7 A. And then we -- because so many of the windows were broken  
8 out of the truck, we actually got a very large tarp and secured  
9 it around the truck before it was placed on a tow bed to haul  
10 for further examination.

11 Q. Where was it hauled to?

12 A. It was hauled to our crime laboratory in Bend.

13 Q. What time did you and Mr. Medlock conclude your work at  
14 the scene of the shooting?

15 A. Approximately 9:35 a.m.

16 Q. The truck arrived at the crime lab in Bend at some time  
17 after that?

18 A. It did.

19 Q. When did you begin examining the truck?

20 A. We began examining the truck the next day, on  
21 January 28th.

22 Q. And were you personally involved in that examination?

23 A. I was.

24 Q. Was anyone else from the Oregon State Police Forensic  
25 Laboratory involved in the examination with you?

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1 A. Lab Director Brian Medlock and Forensic Scientist  
2 Devon Mast.

3 Q. And were any detectives from the Deschutes County  
4 Sheriff's Office involved as well?

5 A. Yes.

6 Q. Were they doing the forensic examination or were they  
7 there for other purposes?

8 A. Primarily for other purposes. When we examine vehicles,  
9 we typically like to have agent representatives with us. They  
10 are usually involved in searches for evidence and extra  
11 collection of evidence; but, ultimately, we're there at their  
12 request, so we like to have them present to assist as possible.

13 Q. So how did you begin the examination of the truck at the  
14 forensic laboratory?

15 A. We always begin with a series of sequential photos and  
16 documentation of the exterior of the vehicle.

17 Q. And did you do that in this case?

18 A. Yes.

19 Q. Did you find any bullet strikes in the white pickup truck?

20 A. We did.

21 Q. How many?

22 A. Four.

23 Q. And where were those bullet strikes located?

24 A. There were three in the front of the vehicle. One on the  
25 hood, one in the front grille, and one on the driver's side

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1 side mirror, and then one in the hood.

2 Q. By the hood, you mean --

3 A. Or, I'm sorry, the roof. Thank you for the clarification.

4 Q. The roof of the cab of the pickup truck?

5 A. Yes.

6 Q. Did you label those different bullet strikes?

7 A. We did.

8 Q. How did you label them?

9 A. The one in the hood was given marker "T".

10 Q. "T" like "Tom"?

11 A. "T" like "Tom."

12 The one in the front grille is given marker "U."

13 Q. Like "union"?

14 A. Yes. The one in the driver's side side-view mirror was  
15 given marker "FF." And then corresponding damage on the rear  
16 driver's side door was given markers "B", "GG" and "HH." And  
17 then the one in the roof was given marker "W."

18 Q. And did anyone take photos of the bullet strikes to the  
19 pickup truck?

20 A. Yes. All photos were taken by Lab Director Medlock.

21 Q. Can you turn to the tab where it says "Exhibits" in the  
22 notebook in front of you, please?

23 A. Yes.

24 Q. Do you see the exhibit labeled "DH004"?

25 A. Yes.



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1 Q. What is it?

2 A. It's a picture of the front of the pickup truck.

3 Q. Showing what?

4 A. It shows the bullet holes marked "T" and "U."

5 Q. And bullet hole "T" is on the passenger side of the front  
6 of the hood of the pickup truck?

7 A. Yes.

8 Q. And the bullet hole marked "U" is in the -- I guess it  
9 would be just to the driver's side of center of the grille of  
10 the pickup truck?

11 A. That's correct.

12 Q. All right. Take a look at Exhibit DH005. What is that?

13 A. That's a mid-range image of the bullet hole in the hood  
14 marked "T."

15 Q. And DH006?

16 A. That's a closeup photograph of that same bullet hole  
17 marked "T."

18 Q. How about DH007?

19 A. That's a closeup photograph of the bullet hole marked "U."

20 Q. Were you able to determine the trajectory for impact "T,"  
21 the bullet hole labeled "T"?

22 A. Yes.

23 Q. What was that trajectory?

24 THE COURT: You can ask a leading question.

25 ///

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1 BY MR. SUSSMAN: (Continuing)

2 Q. Was it approximately about a 1-degree downward angle?

3 A. Yes.

4 Q. Left to right of midline, at approximately 17 degrees?

5 A. Yes.

6 Q. Front to rear?

7 A. Yes.

8 Q. By left of the midline, what are we talking about?

9 A. If you're looking directly at the front of the pickup  
10 truck, you can imagine a perpendicular line coming straight out  
11 at you at 90 degrees. It was 17 degrees to the left of that  
12 line.

13 Q. And were you able to determine the trajectory of  
14 impact "T" by using a ballistic rod?

15 A. Yes.

16 Q. And did you find two separate impact holes to put that  
17 ballistic rod through?

18 A. Yes.

19 Q. How about impact "U"? What was the trajectory on that  
20 one?

21 A. That one was almost orthogonal. So 1 degree downward  
22 angle and 1 degree to the left of midline.

23 Q. And for those nonscientists among us, like me,  
24 "orthogonal" means pretty much straight in, doesn't it?

25 A. Correct.

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1 Q. All right. Did you measure that trajectory the same way,  
2 through the use of a ballistic rod?

3 A. Yes.

4 Q. Through two separate holes in the front of the vehicle?

5 A. Right. Through a -- through a series of perforations in  
6 the radiator, which is rather thick.

7 Q. And are those photos you've looked at so far, DH002  
8 through -07, fair and accurate representations of the impacts  
9 "T" and "U" in the front of the pickup truck?

10 A. Yes.

11 MR. SUSSMAN: We'd offer those, Your Honor.

12 THE COURT: They're received.

13 BY MR. SUSSMAN: (Continuing)

14 Q. Now let's talk about the one labeled as impact "W." That  
15 was the one that was on the roof cab?

16 A. Yes.

17 Q. Impact "T" struck the front of the truck hood; right?

18 A. Yes.

19 Q. Impact "U" struck the front of the grille of the truck?

20 A. Yes.

21 Q. You said that both of those bullets were traveling almost  
22 level at a 1-degree downward angle?

23 A. Correct.

24 Q. From the front of the truck to the rear?

25 A. Yes.

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1 Q. How about impact "W," the one that struck the truck's --  
2 the roof of the truck's cab, did it appear that impact "W" was  
3 traveling almost level?

4 A. No.

5 Q. Did it appear to you that the bullet that caused impact  
6 "W" was traveling from the front of the truck to the rear?

7 A. No.

8 Q. And was the impact "W" hole similar in appearance to  
9 either impact "T" or impact "U"?

10 A. Somewhat similar in appearance but ultimately different.

11 Q. Let's take a look at some pictures of impact "W." Let's  
12 start with D -- the exhibit marked DH008. What is that?

13 A. That's a mid-range image taken from the passenger side of  
14 the vehicle, looking at the bullet hole in the roof.

15 Q. And are we looking at the initial impact point forward as  
16 we're looking at DH008?

17 A. Can you rephrase that for me?

18 Q. Sure. The point of the bullet hole marked "W," that's  
19 closest to us, from our perspective, looking at that  
20 photograph, is that the initial impact point of that particular  
21 round?

22 A. Yes.

23 Q. Okay. What is DH009, please?

24 A. That's a closer image of the bullet hole marked "W."

25 Q. And are DH008 and -009 fair and accurate representations

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1 of bullet impact "W"?

2 A. Yes.

3 MR. SUSSMAN: We would offer those, Your Honor.

4 THE COURT: Received.

5 BY MR. SUSSMAN: (Continuing)

6 Q. Would you describe bullet -- the impact "W" as a fairly  
7 low-angle impact?

8 A. Yes.

9 Q. And have you seen low-angle impacts, like impact "W,"  
10 before?

11 A. Yes.

12 Q. Is there anything particularly odd or unusual or  
13 uncharacteristic about impact "W"?

14 A. It does have a longer pinch point than can sometimes be  
15 seen but nothing that struck me as incredibly unusual.

16 Q. What do you mean by "pinch point"?

17 A. You can see an area -- can I circle on this screen? Is  
18 that --

19 Q. Yes, you can.

20 THE COURT: Probably.

21 THE WITNESS: Okay. It didn't work. I think I can  
22 explain it.

23 When a bullet strikes a painted surface, the point that it  
24 makes initial contact -- oh, there we go. Yes. The point that  
25 it makes initial contact, sometimes some of the paint survives

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1 that process.

2 In this case, you can see a strip of white paint. That  
3 paint survived the bullet striking that surface, and that can  
4 be called a pinch point.

5 BY MR. SUSSMAN: (Continuing)

6 Q. You said that one looked a little longer than you  
7 sometimes see a low-impact -- than you see in a low-angle  
8 impact?

9 A. If you take a picture of a very traditional pinch point,  
10 it's usually just a pretty small area. This one is a longer  
11 line; but, again, nothing I considered ridiculously atypical.

12 Q. Was there anything about impact "W" that you thought would  
13 make it impossible to measure a trajectory of the bullet that  
14 caused it?

15 A. No.

16 Q. Were you able to determine the trajectory for the bullet  
17 that caused impact "W"?

18 A. I was.

19 Q. How did you do that?

20 A. Using ballistic rods again and the same measuring devices;  
21 but in this case, because the bullet hole was a slightly larger  
22 hole, we used a centering cone to stabilize the rod in the  
23 bullet hole.

24 Q. What is a centering cone?

25 A. It's a plastic cone that's got a hollowed-out center.

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1 It's traditionally supplied with trajectory kits. It's in the  
2 shape of a cone, and it helps to stabilize rods in larger  
3 holes.

4 Q. Now, before using the centering cone in this case, did you  
5 try and place the rod into the hole by hand?

6 A. Yes. It's our standard practice that we would attempt to  
7 use a rod without the cone first. And if we're unhappy with  
8 the placement of that rod, so if it's not stable, then we would  
9 use the cone to stabilize the rod so that we could get an  
10 accurate measurement.

11 Q. When you placed the rod by hand in impact "W," was it  
12 stable enough to get an accurate measurement?

13 A. Without the cone?

14 Q. Without the cone.

15 A. No.

16 Q. So you used a centering cone?

17 A. We used a centering cone.

18 Q. There's been some discussion in this case among the  
19 ballistics experts about something called the two-hole method.  
20 Are you familiar with that?

21 A. Yes.

22 Q. And, essentially -- and correct me if I get this wrong --  
23 it means that if there's two separate impact holes from the  
24 same bullet, you put the trajectory rod through the first hole  
25 and through the second hole, and that gives you a pretty

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1 accurate trajectory for that bullet; is that correct?

2 A. Correct.

3 Q. Were you able to use the two-hole method with impact "W"?

4 A. Yes. We were able to use a series of perforations. So  
5 when the bullet struck the roof, it traveled through the sheet  
6 metal and then into the headliner, and the headliner had  
7 multiple layers. So it had a pretty thick foam layer. It then  
8 had a fiberglass-appearing layer, and then, again, the -- a  
9 small layer of foam and the cloth headliner.

10 So the bullet perforated all the way through the sheet  
11 metal and through all of those layers and then exited. So the  
12 rod was able to be placed along the path of that series of  
13 perforations.

14 Q. And once you placed the ballistic rod through the hole and  
15 through the path and all those layers, were you able to  
16 determine a trajectory path that that bullet took after it  
17 pierced the roof?

18 A. Yes.

19 Q. And were you able to hold the rod stable in place with the  
20 use of a centering cone?

21 A. Yes.

22 Q. Were you able to determine the general direction from  
23 which the bullet that caused impact "W" came?

24 A. Yes.

25 Q. How did you do that?



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1 A. Again, just using the ballistic rods and measuring the  
2 trajectory points to the general direction that the bullet came  
3 from.

4 Q. Once you placed the ballistic rod through the hole and  
5 through the -- the hole in the sheet metal and then through the  
6 path that the bullet took, using the centering cone, were you  
7 able to leave the rod in place stable on its own without  
8 anybody having to hold it?

9 A. Yes.

10 Q. And once that was done, were you able to measure both the  
11 vertical angle and the horizontal azimuth angle of the  
12 trajectory rod?

13 A. Yes.

14 Q. Once the ballistic rod was in place, how did it line up  
15 with the pinch point, the long pinch point, of impact "W"?

16 A. The cone rested directly through that area of the pinch  
17 point; so, therefore, the rod rested through that area.

18 Q. Once the rod was in place, how did you measure the  
19 horizontal azimuth?

20 A. We used -- you need to have a plane to measure the angle  
21 from. So if a bullet goes into a wall, that's a pretty easy  
22 flat plane of reference to measure from. So you put your  
23 protractor directly against it and measure the angle out from  
24 the wall. Because it was in the roof in this case, we needed a  
25 line to measure from. Luckily, the roof of this vehicle had a

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1 series of raised ridges that were parallel lines, so there  
2 happened to be a plane right near this bullet impact site. So  
3 we were able to use that as the flat plane that we placed our  
4 protractor against and then take the measurement that the rod  
5 intersected that protractor.

6 THE COURT: Are we going to have a demonstration?

7 MR. SUSSMAN: We've got pictures, Your Honor.

8 THE COURT: Just a minute. It's 4:00. We're going  
9 to have to recess until tomorrow.

10 So I assume you would -- you have quite a bit more to  
11 cover with her, don't you?

12 MR. SUSSMAN: A little bit, yeah.

13 THE COURT: Also we're going to need  
14 cross-examination. So it's a good time to halt.

15 Is the rig still available?

16 MR. SUSSMAN: Mr. Finicum's truck, Your Honor?

17 THE COURT: Yeah.

18 MR. SUSSMAN: It is still in custody in secure  
19 evidence at the Deschutes County Sheriff's Office.

20 THE COURT: Okay. I just asked the question. It's a  
21 non sequitur. I just want to know.

22 Are you going -- are you going to have any visual of the  
23 testing that she did or that was done?

24 MR. SUSSMAN: By "visual," do you mean photographs?  
25 Videotapes?

1 THE COURT: Of the actual placement of the rods or  
2 whatever was used to do the measurements.

3 MR. SUSSMAN: Yes. We have photographs of the rods  
4 in place with the protractor and with an inclinometer to  
5 measure vertical angle.

6 THE COURT: But not a video?

7 MR. SUSSMAN: I don't believe there's a video,  
8 Your Honor.

9 THE COURT: Okay. That's fine. I'm just asking.  
10 I'm not suggesting.

11 We'll be picking up tomorrow.

12 You can relax.

13 What -- who are you going to call tomorrow?

14 MR. SUSSMAN: Tomorrow, Your Honor, we have -- I'm  
15 not sure of the order yet because we've got some travel  
16 logistics to deal with, but we'll conclude with Ms. Dickerson;  
17 and then -- and then we're going to call Michael Haag, who's a  
18 ballistic -- the other government ballistic expert;  
19 deputy Kevin Turpen from the Deschutes County Sheriff's Office;  
20 and then I believe there are two defense experts scheduled to  
21 testify: Mr. Matt Noedel, their ballistics expert, and the  
22 statistician, Mr. Bray.

23 THE COURT: Okay. Fine.

24 That was my point with your question, is you were -- it  
25 appeared to me that you were trying to get in what the opinions

1 were of people who are not going to be witnesses. Maybe I read  
2 you wrong.

3 MR. MALONEY: Professor Smith will be a witness for  
4 the government in this proceeding, Your Honor.

5 THE COURT: Yeah. The other thing is I have -- I  
6 never allow one witness to pass upon the credibility of another  
7 witness. No way. Just to warn you all.

8 So that's it. Okay. I appreciate everybody's expertise  
9 today. It's been a wonderful professional demonstration by  
10 both sides. I'll see you in the morning at 9:00. Somebody --  
11 Becky said we told you 9:30.

12 DEPUTY COURTROOM CLERK: It's been changed.

13 THE COURT: We'll start at 9:00 a.m.

14 Does anybody have any questions? For you?

15 MR. SUSSMAN: Not for the government. No,  
16 Your Honor.

17 THE COURT: Do you?

18 MR. CARY: No, Your Honor.

19 THE COURT: Thank you. Have a nice evening.

20 (Hearing adjourned.)  
21  
22  
23  
24  
25

C E R T I F I C A T E

United States of America v. W. Joseph Astarita

3:17-cr-00226-JO

EVIDENTIARY HEARING

May 21, 2018

I certify, by signing below, that the foregoing is a true and correct transcript of the record, taken by stenographic means, of the proceedings in the above-entitled cause. A transcript without an original signature, conformed signature, or digitally signed signature is not certified.

/s/Jill L. Jessup, CSR, RMR, RDR, CRR, CRC

Official Court Reporter  
Oregon CSR No. 98-0346

Signature Date: 6/11/18  
CSR Expiration Date: 9/30/20